

1. 米標準物質および栄養塩測定用海水標準物質についての紹介

(株)環境総合テクノス

## The General Environmental Technos co.,Ltd (KANSO Technos)

### Laboratory for Instrumentation and Analysis

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An international standard of examination place quality system ISO/IEC17025 (General requirements for the competence of testing and calibration laboratories) and environmental management system ISO14001 are acquired as a quality and environmental protection.  
 We are actively participating in research society, and work on the introduction of new information and high technology.

#### Activities

- (1) Water survey and analysis for environment impact assessment
- (2) Waste water, sludge and fuel oil analysis
- (3) Maintenance service of atmospheric phenomena and observation equipments
- (4) Maintenance service of automatic air quality monitor for power stations
- (5) Microanalysis of Dioxins and Endocrine disruptors
- (6) Analysis of environmental radioactivity
- (7) Survey and analysis on oceanographic investigation
- (8) Survey and analysis on biological study
- (9) Survey and analysis on Soil Contamination Countermeasures Law
- (10) Development of reference materials








Main Laboratory                      RM production facility

#### Development of reference materials

##### 1. Reference Material for Nutrients in Seawater(RMNS) on the Seawater Base (PAT3477468-2003)

The concentrations of nutrients in seawater are important for various oceanographic uses.  
 We succeeded in preparing a reference material based on natural seawater, which has passed homogeneity and long-term stability tests.  
 To evaluate the reference material, an intercomparison was conducted (Aoyama2007).

Seawater Base on the Seawater Base (Seawater Base on the Seawater Base)									
Item	Unit	Value							
NO <sub>3</sub> -N	μg/L	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NO <sub>2</sub> -N	μg/L	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
PO <sub>4</sub> -P	μg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
SiO <sub>4</sub> -Si	μg/L	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Fe	μg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Mn	μg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Zn	μg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Cu	μg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Co	μg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Ni	μg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
B	μg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Mg	μg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Ca	μg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
K	μg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Na	μg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05

\*Source: Comparability of Environmental Reference Materials of the IAEA International Atomic Energy Agency (IAEA) Analytical Services, 2007, 1151-1154  
<http://www.mri-jma.go.jp/Dep/gc/IRMNScomp.html>





Fig. 1-1 Sterilization process                      Fig. 1-2 Automatic dispensing device                      Fig. 1-3 Completed product

##### 2. Reference Material for Dissolved Inorganic Carbon in Seawater on the Seawater Base (under development)

The concentrations of dissolved inorganic carbon(DIC) in sea water is important for various oceanographic uses.  
 We are trying to prepare non-toxic reference material for DIC based on natural seawater.  
 This reference material is operated by the finance support (Grant in Aid for Science Research(KAKENHI1710015) of Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan )





Fig. 2-1 Sterilization process                      Fig. 2-2 Dispensing work                      Fig. 2-3 Completed product

##### 3. Reference Material for Dioxins in wastewater

We developed wastewater certified reference material for determination of dioxins (polychlorodibenzo-p-dioxins, polychlorodibenzofurans and dioxin-like polychlorobiphenyls). This reference material is the first wastewater certified reference material for the analysis of dioxins in the world.  
 This reference material was developed jointly with The Japan Society for Chemical Analysis (JSAC) and National Institute of Technology and Evaluation(NITE) by the finance support from Ministry of Economy, Trade and Industry(METI).





Fig. 3-1 Dioxin treatment plant                      Fig. 3-2 Dispensing work                      Fig. 3-3 Completed product

The Japan Society for Analytical Chemistry Certified Reference Material  
 (JAC-011: Wastewater for Analysis of Dioxins)  
<http://www.ni.ac.jp/jsac/indexing.html>

##### 4. Reference Material for Cadmium in rice

The content of cadmiums and pesticides in rice, which is very important for our principal food, is keen on various fields.  
 We succeeded in preparing a reference material for cadmium in rice, which has passed homogeneity tests.  
 This reference material research was contracted by with National Metrology Institute of Japan(NMI).






Fig. 4-1 Rice milling                      Fig. 4-2 Split of rice powder                      Fig. 4-3 Boiling work                      Fig. 4-4 Completed product

# REFERENCE MATERIAL FOR NUTRIENTS IN SEAWATER (RMNS) ON THE SEAWATER BASE

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## 1. Background

The General Environmental Technos Co., Ltd. (former company name; The Kansai Environmental Engineering Center Co., Ltd.) has carried out the oceanographic surveys in the western North Pacific Ocean since 1990. Long-term monitoring of nutrients is one of the most important issues in the ocean sciences.

We have been carrying out high quality, long-term observations at research cruises in the open ocean.

For example, the nitrate measurement during the WOCE, the required accuracy was better than 1% and the repeatability (precision) was 0.2%. In order to improve the quality of nutrients measurements, it is necessary to make reference materials with high quality.

At the hydrographic stations, measurements of nutrients were made from the surface to the bottom. We considered that the reference materials were necessary for producing high quality data.



Main Lab



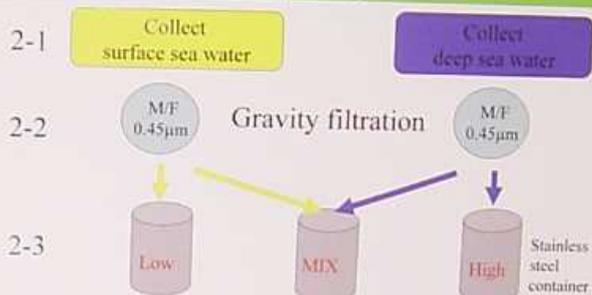
Reference Material Works

Provide 2,000 bottles as a same lot.



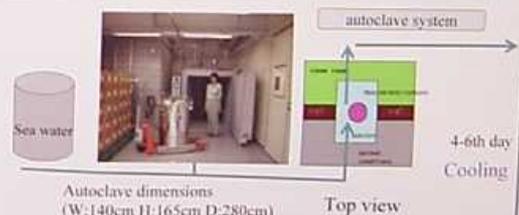
Original Stainless Steel Container 230 liters

## 2. Procedure for making reference material for nutrients in seawater. (PAT.)



Multiple concentrations of the reference material can be made by changing the mixing ratio of seawater.

### 2-4 Autoclaved at 120 °C for 2 hours twice



### 2-5 Bottling at clean bench



## 3. Summary

- 1) RMNS can be made at natural seawater base, and RMNS has the same matrix as that of simple seawater.
- 2) Easy operation at onboard analysis. Since a bottle of RMNS contains all nutrients which are in interest in oceanography, the simple operation at Continuous Flow Automated Analysis will be available.
- 3) The concentrations of RMNS for nitrate, nitrite, silicate and phosphate ranged from very low, nearly zero, to higher concentrations observed in the mid depth of the Pacific Ocean.
- 4) The stability of RMNS has been maintained during the four years.
- 5) RMNS can be stored in normal environment (room temperature).

6) We confirmed homogeneity of RMNS in each lot.

Lot#	NO <sub>3</sub> -N (µmol/kg)	NO <sub>2</sub> -N (µmol/kg)	PO <sub>4</sub> -P (µmol/kg)	PO <sub>4</sub> -P (µmol/kg)
AV	33.21 ±0.07	0.10 ±0.00	158.6 ±0.32	2.44 ±0.00
AW	21.47 ±0.07	0.44 ±0.00	120.1 ±0.13	2.11 ±0.01
AX	21.79 ±0.06	0.18 ±0.00	78.30 ±0.16	1.78 ±0.00
AY	5.52 ±0.04	0.68 ±0.00	38.21 ±0.14	0.50 ±0.00
BA	0.02 ±0.01	0.00 ±0.00	1.60 ±0.17	0.04 ±0.01

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