NO_3 Nitrate

In this analyte the procedure should be divided into 3 methods according to the sample state.
Be careful that each method uses their specified reagent.

1. NO_3_1 Nitrate (NO_2 = 0 mg/L)

Range : 0.20 - 5.00 mg/L (ppm)
Reagent : LR-NO_3 No.19
Perform the regular Nitrate measurement procedure.

2. NO_3_2 Nitrate (NO_2 ≤ 0.1 mg/L)

Range : 0.20 - 5.00 mg/L (ppm)
Reagent : LR-NO_2 No.18, LR-NO_3 No.19
It is necessary to zero adjustment with the color-developed sample with reagent No.18 before the regular Nitrate measurement procedure.

3. NO_3_3 Nitrate (NO_2 0.1 - 10 mg/L)

Range : 0.20 - 5.00 mg/L (ppm)
Reagent : Pretreatment Reagent for Nitrate (NO_3-RA), LR-NO_3 No.19
It is necessary to remove Nitrite by pretreatment reagent before the regular Nitrate measurement procedure.

Cautions

On the line of reagent "LR-NO_3" will be displayed.
The measurement should be carried out following each method with each reagent.

NO_3_1 Nitrate (NO_2 = 0)

Color change : None → Light red → Red
Method : Reduction and Naphthylethylenediamine
Range : 0.20 - 5.00 mg/L (ppm)
Reagent : LR-NO_3 No.19 R-1(Small Pack), R-2(Large Pack)
Reaction Time : 5 min. after R-2 reagent is added.

Procedure

1. Press <NO_3_1>.
2. Press <Enter> to change over to the display of measurement procedure.
3. Fill the cell with 25 mL of sample (up to the line). (Fig.1)
4. Insert the cell into the cell box with ▼ of cell facing ▲ of cell box. Press <Blank>. (Fig.2)
5. Take out the cell from the cell box and add R-1 and R-2 Reagent into the cell. Press <Start>. (Fig.3)
6. Cap the cell tightly and shake the cell strongly 120 times a minute. (Fig.4)
7. Before 5 minutes pass, insert the cell into the cell box with ▼ of cell facing ▲ of cell box. (Fig.5)
8. After 5 minutes passed, the measurement will be displayed automatically. The measurement is printed out when the Printer power is ON.

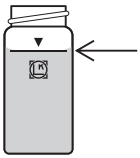
Fig.1

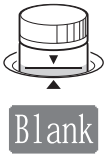

Fig.2

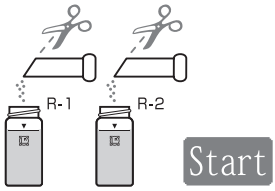

Fig.3


Fig.4


Fig.5

Cautions

1. The optimum pH is 2 in the reaction.
   When pH level exceed pH 3 - 9, adjust the pH level with diluted sulfuric acid or diluted sodium hydroxide solution.
2. Keep sample temeprature in the range 15 - 30 ℃ .
3. In the procedure 7, the shaking manner influences result value.
   This shaking manner should be kept strictly as 120 times per a minute.
4. In case of the nitrite coexisting, strong reaction color of nitrite ion interferes with nitrate ion.
   For the measurement of Nitrate coexisting Nitrite, refer to each section as follows.
   " NO_3_2 Nitrate ($NO_2 \leq 0.1$) "
   " NO_3_3 Nitrate ($NO_2 \leq 10$) "
5. The pH of the measured sample is about 2.
   Measured sample contains about 2 mg/measurement of Zinc.

Interferences

The built-in calibration curve is programmed based on the standard solution. Below is the list of interference data by adding each of the single substances to the standard solution. A sample which contains over the level of these substances will cause inaccurate result.

Except for Heavy metal ions:

≤ 100 mg/L,	:	B(Ⅲ) , Cl^- , F^- , K^+ , Mg^{2+} , Na^+ , PO_4^{3-}
≤ 50 mg/L,	:	Ca^{2+} , NH_4^+ , SO_4^{2-} , Phenol
≤ 5 mg/L,	:	I^-
Sub-ppm level	:	NO_2^- , Anionic surfactant , Residual chlorine

Heavy metal ions:

≤ 10 mg/L,	:	Al^{3+} , Ba^{2+} , CN^- , Co^{2+} , Cr^{3+} , Fe^{3+} , Mn^{2+} , Mo(Ⅵ) , Ni^{2+} , Zn^{2+}
≤ 5 mg/L,	:	Fe^{2+}
Sub-ppm level	:	Cr(Ⅵ) , Cu^{2+}

Not suitable for sea water samples.
Oxidizing substances interfere with reduction and make negative error.

NO_3_2 Nitrate (NO_2 ≤ 0.1)

Color change : None → Light red → Red
Method : Reduction and Naphthylethylenediamine
Range : 0.20 - 5.00 mg/L (ppm)
Reagent : LR-NO_2 No.18 R-1(Small Pack), R-2(Large Pack)
LR-NO_3 No.19 R-1(Small Pack), R-2(Large Pack)
Reaction Time : 5 min. after R-2 reagent of LR-NO_3 is added.

Before the regular Nitrate measurement procedure

As a preparation for the measurement procedure, the color-developed sample should be obtained from Nitrite in the sample with LR-NO_2.

1. Fill the cell with 25 mL of sample (up to the line). (Fig.1)

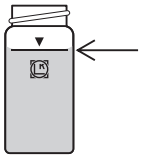

Fig.1

2. Add R-1 Reagent of LR-NO_2 into the cell, cap the cell tightly and immediately shake the cell strongly for 10 sec. (Fig.2)

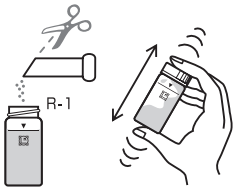

Fig.2

3. Add R-2 Reagent of LR-NO_2 into the cell, cap the cell tightly and shake the cell 5 - 6 times. Then wait for 5 min. (Fig.3)

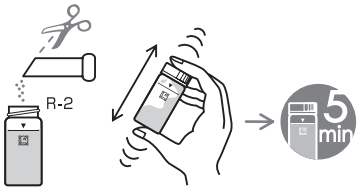

Fig.3

Procedure

1. Press <NO_3_2>.
2. Press <Enter> to change over to the display of measurement procedure.

3. Insert the cell filled with the color-developed sample into the cell box with ▼ of cell facing ▲ of cell box. Press <Blank>. (Fig.4)

4. Take out the cell from the cell box and pour out the color-developed sample.
   Rinse the cell. (Fig.5)

5. Fill the cell with 25 mL of new sample (up to the line). (Fig.6)

6. Add R-1 and R-2 Reagent into the cell and press <Start>. (Fig.7)

7. Cap the cell tightly and shake the cell strongly 120 times a minute. (Fig.8)

8. Before 5 minutes pass, insert the cell into the cell box with ▼ of cell facing ▲ of cell box. (Fig.9)

9. After 5 minutes passed, the measurement will be displayed automatically.
   The measurement is printed out when the Printer power is ON.

Fig.4

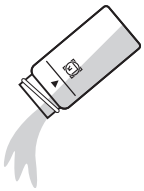
Fig.5

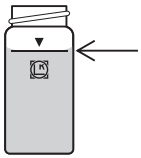
Fig.6

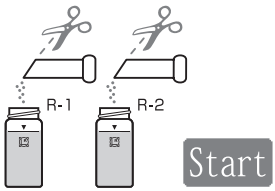

Fig.7


Fig.8


Fig.9

Cautions

Refer to NO_3_1 Nitrate (NO_2 = 0).

NO_3_3 Nitrate (NO_2 0.1 - 10 mg/L)

Color change : None → Light red → Red
Method : Reduction and Naphthylethylenediamine
Range : 0.20 - 5.00 mg/L (ppm)
Reagent : Pretreatment Reagent for Nitrate (NO_3-RA) (Pack)
LR-NO_3 No.19 R-1(Small Pack), R-2(Large Pack)
Specified tool : A heat set
Reaction Time : 5 min. after R-2 reagent of LR-NO_3 is added.

Before the regular Nitrate measurement procedure

As a pretreatment, remove the coexisting Nitrite from the sample with NO_3-RA.

1. Fill the beaker with 25 mL of sample and add one pack of NO_3-RA.
   Stir the sample 5 - 6 times. (Fig.1)

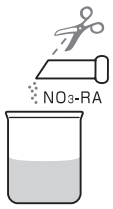

Fig.1

2. Heat the sample up to boiling for about 2 minutes.
   Then cool down the beaker till the room temperature. (Fig.2)

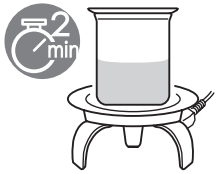

Fig.2

3. Pour the sample in the beaker into a cell and add pure water up to 25mL (up to the line). (Fig.3)

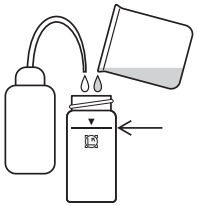
Fig.3

Procedure

1. Press <NO_3_3>.
2. Press <Enter> to change over to the display of measurement procedure.

3. Insert the cell filled with pretreated sample into the cell box with ▼ of cell facing ▲ of cell box.
   Press <Blank>. (Fig.4)

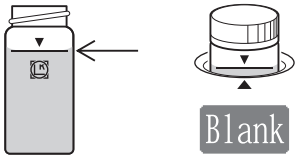

Fig.4

4. Take out the cell from the cell box and add R-1 and R-2 Reagent of LR-NO_3 into the cell and press <Start>. (Fig.5)

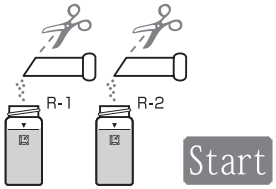

Fig.5

5. Cap the cell tightly and shake the cell strongly 120 times a minute. (Fig.6)


Fig.6

6. Before 5 minutes pass, insert the cell into the cell box with ▼ of cell facing ▲ of cell box. (Fig.7)

7. After 5 minutes passed, the measurement will be displayed automatically.
   The measurement is printed out when the Printer power is ON.


Fig.7

Cautions

Refer to NO_3_1 Nitrate (NO_2 = 0).

NO_3-N Nitrate-Nitrogen

In this analyte the procedure should be divided into 3 methods according to the sample state.
Be careful that each method uses their specified reagent.

1. NO_3-N_1 Nitrate-Nitrogen (NO_2-N = 0 mg/L)

Range : 0.050 - 1.100 mg/L (ppm)
Reagent : LR-NO_3 No.19
Perform the regular Nitrate-N measurement procedure.

2. NO_3-N_2 Nitrate-Nitrogen (NO_2-N ≤ 0.03 mg/L)

Range : 0.050 - 1.100 mg/L (ppm)
Reagent : LR-NO_2 No.18, LR-NO_3 No.19
It is necessary to blank reading with the color-developed sample with reagent No.18 before the regular Nitrate-N measurement procedure.

3. NO_3-N_3 Nitrate-Nitrogen (NO_2-N 0.03 - 3 mg/L)

Range : 0.050 - 1.100 mg/L (ppm)
Reagent : Pretreatment Reagent for Nitrate (NO_3-RA), LR-NO_3 No.19
It is necessary to remove Nitrite by pretreatment reagent before the regular Nitrate-Nitroegen measurement procedure.

Cautions

On the line of reagent "LR-NO_3" will be displayed.
The measurement should be carried out following each method with each reagent.

NO_3-N_1 Nitrate-Nitrogen (NO_2-N = 0 mg/L)

Color change : None → Light red → Red
Method : Reduction and Naphthylethylenediamine
Range : 0.050 - 1.100 mg/L (ppm)
Reagent : LR-NO_3 No.19 R-1(Small Pack), R-2(Large Pack)
Reaction Time : 5 min. after R-2 reagent is added.

Procedure

1. Press <NO_3-N_1>.
2. Press <Enter> to change over to the display of measurement procedure.
3. Fill the cell with 25 mL of sample (up to the line). (Fig.1)
4. Insert the cell into the cell box with ▼ of cell facing ▲ of cell box. Press <Blank>. (Fig.2)
5. Take out the cell from the cell box and add R-1 and R-2 Reagent into the cell. Press <Start>. (Fig.3)
6. Cap the cell tightly and shake the cell strongly 120 times a minute. (Fig.4)
7. Before 5 minutes pass, insert the cell into the cell box with ▼ of cell facing ▲ of cell box. (Fig.5)
8. After 5 minutes passed, the measurement will be displayed automatically. The measurement is printed out when the Printer power is ON.

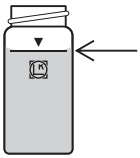
Fig.1

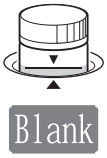

Fig.2

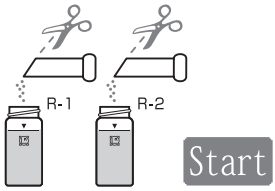

Fig.3


Fig.4


Fig.5

Cautions

1. The optimum pH is 2 in the reaction.
   When pH level exceed pH 3 - 9, adjust the pH level with diluted sulfuric acid or diluted sodium hydroxide solution.
2. Keep sample temeprature in the range 15 - 30 ℃ .
3. In the procedure 7, the shaking manner influences result value.
   This shaking manner should be kept strictly as 120 times per a minute.
4. In case of the nitrite coexisting, strong reaction color of nitrite ion interferes with nitrate ion.
   For the measurement of Nitrate coexisting Nitrite, refer to each section as follows.
   " NO_3_2 Nitrate-Nitrogen (NO_2-N ≤ 0.03) "
   " NO_3_3 Nitrate-Nitrogen (NO_2-N ≤ 3) "
5. The pH of the measured sample is about 2.
   Measured sample contains about 2 mg/measurement of Zinc.

Interferences

The built-in calibration curve is programmed based on the standard solution. Below is the list of interference data by adding each of the single substances to the standard solution. A sample which contains over the level of these substances will cause inaccurate result.

Except for Heavy metal ions:

≤ 100 mg/L,	:	B(Ⅲ) , Cl^- , F^- , K^+ , Mg^{2+} , Na^+ , PO_4^{3-}
≤ 50 mg/L,	:	Ca^{2+} , NH_4^+ , SO_4^{2-} , Phenol
≤ 5 mg/L,	:	I^-
Sub-ppm level	:	NO_2^- , Anionic surfactant , Residual chlorine

Heavy metal ions:

≤ 10 mg/L,	:	Al^{3+} , Ba^{2+} , CN^- , Co^{2+} , Cr^{3+} , Fe^{3+} , Mn^{2+} , Mo(Ⅵ) , Ni^{2+} , Zn^{2+}
≤ 5 mg/L,	:	Fe^{2+}
Sub-ppm level	:	Cr(Ⅵ) , Cu^{2+}

Not suitable for sea water samples.
Oxidizing substances interfere with reduction and make negative error.

NO_3-N_2 Nitrate-Nitrogen (NO_2-N ≤ 0.03)

Color change : None → Light red → Red
Method : Reduction and Naphthylethylenediamine
Range : 0.050 - 1.100 mg/L (ppm)
Reagent : LR-NO_2 No.18 R-1(Small Pack), R-2(Large Pack)
LR-NO_3 No.19 R-1(Small Pack), R-2(Large Pack)
Reaction Time : 5 min. after R-2 reagent of LR-NO_3 is added.

Before the regular Nitrate measurement procedure

As a preparation for the measurement procedure, the color-developed sample should be obtained from Nitrite-N in the sample with LR-NO_2.

1. Fill the cell with 25 mL of sample (up to the line). (Fig.1)

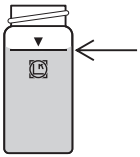

Fig.1

2. Add R-1 Reagent of LR-NO_2 into the cell, cap the cell tightly and immediately shake the cell strongly for 10 sec. (Fig.2)

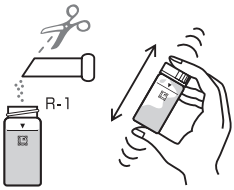

Fig.2

3. Add R-2 Reagent of LR-NO_2 into the cell, cap the cell tightly and shake the cell lightly 5 - 6 times. Then wait for 5 min. (Fig.3)

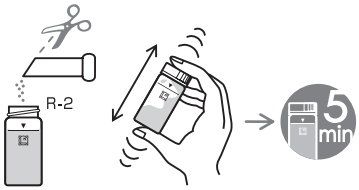

Fig.3

Procedure

1. Press <NO_3-N_2>.
2. Press <Enter> to change over to the display of measurement procedure.
3. Insert the cell filled with color-developed sample into the cell box with ▼ of cell facing ▲ of cell box. Press <Blank>. (Fig.4)
4. Take out the cell from the cell box and pour out the color-developed sample.
   Wash the cell. (Fig.5)
5. Fill the cell with 25 mL of new sample (up to the line). (Fig.6)
6. Add R-1 and R-2 Reagent of LR- NO_3 into the cell and press <Start>. (Fig.7)
7. Cap the cell tightly and shake the cell strongly 120 times a minute. (Fig.8)
8. Before 5 minutes pass, insert the cell into the cell box with ▼ of cell facing ▲ of cell box. (Fig.9)
9. After 5 minutes passed, the measurement will be displayed automatically.
   The measurement is printed out when the Printer power is ON.

Fig.4

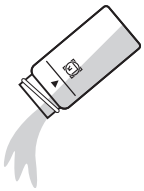
Fig.5

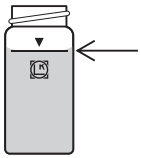
Fig.6

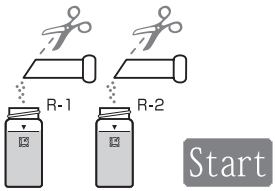

Fig.7


Fig.8


Fig.9

Cautions

Refer to NO_3-N_1 Nitrate-Nitrogen (NO_2-N = 0).

NO_3-N_3 Nitrate-Nitrogen (NO_2-N ≤ 3)

Color change : None → Light red → Red
Method : Reduction and Naphthylethylenediamine
Range : 0.050 - 1.100 mg/L (ppm)
Reagent : Pretreatment Reagent for Nitrate (NO_3-RA) (Pack)
LR-NO_3 No.19 R-1(Small Pack), R-2(Large Pack)
Specified tool : A heat set
Reaction Time : 5 min. after R-2 reagent of LR-NO_3 is added.

Before the regular Nitrate measurement procedure

As a pretreatment, remove the coexisting Nitrite-N from the sample with NO_3-RA.

1. Fill the beaker with 25 mL of sample and add one pack of NO_3-RA.
   Stir the sample 5 - 6 times. (Fig.1)

2. Heat the sample up to boiling for about 2 minutes.
   Then cool down the beaker till the room temperature. (Fig.2)

3. Pour the sample in the beaker into a cell and add pure water up to 25mL (up to the line). (Fig.3)

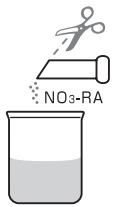

Fig.1

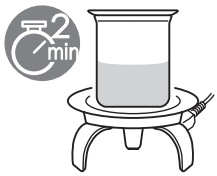

Fig.2

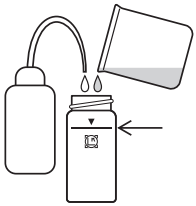
Fig.3

Procedure

1. Press <NO_3-N_3>.
2. Press <Enter> to change over to the display of measurement procedure.

3. Insert the cell filled with pretreated sample into the cell box with ▼ of cell facing ▲ of cell box.
   Press <Blank>. (Fig.4)

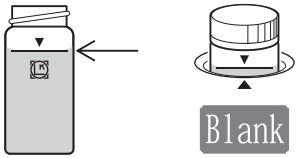

Fig.4

4. Take out the cell from the cell box and add R-1 and R-2 Reagent of LR-NO_3 into the cell and press <Start>. (Fig.5)

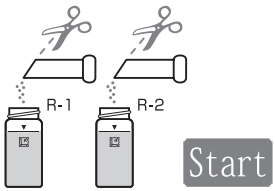

Fig.5

5. Cap the cell tightly and shake the cell strongly 120 times a minute. (Fig.6)


Fig.6

6. Before 5 minutes pass, insert the cell into the cell box with ▼ of cell facing ▲ of cell box. (Fig.7)

7. After 5 minutes passed, the measurement will be displayed automatically.
   The measurement is printed out when the Printer power is ON.


Fig.7

Cautions

Refer to NO_3-N_1 Nitrate-Nitrogen (NO_2-N = 0).