Nonionic surfactants

DOC316.53.01530

Colorimetric Method **Method 10275**

0.2 to 6.0 mg/L Triton X-100 **TNTplus® 875**

Scope and application: For water, wastewater, surface water, formulations, degreasing baths, wash solutions and process analysis.

Test preparation

Instrument-specific information

Table 1 shows all of the instruments that have the program for this test. The table also shows the adapter and light shield requirements for the applicable instruments that can use TNTplus vials.

To use the table, select an instrument, then read across to find the applicable information for this test.

Table 1 Instrument-specific information for TNTplus vials

Instrument	Adapters	Light shield
DR 6000, DR 5000	—	—
DR 3900	—	LZV849
DR 3800, DR 2800	—	LZV646
DR 1900	9609900 or 9609800 (A)	—

Before starting

DR 3900, DR 3800, DR 2800: Install the light shield in Cell Compartment #2 before this test is started.
Review the safety information and the expiration date on the package.
The sample pH must be 4–9 for accurate results.
The temperature of the samples and reagents must be 20-23 °C (68-73.4 °F) for accurate results.
The recommended temperature for reagent storage is 15–25 °C (59–77 °F).
Accurate results are only possible when the mixing step in the test procedure is correct. If the mixing rate is too slow, some surfactants stay in the aqueous phase and cause low results. If the mixing rate is too fast or if the vial is shaken, the phase separation occurs too slowly (after some hours) and causes high results.
The nonionic surfactants test procedure measures alkylphenol ethoxylates (AP(EO)n), fatty alcohol ethoxylates (FA(EO)n) and polyethylene glycols (PEG). All of the measurements are shown as mg/L nonion. surf. The procedure cannot identify one substance.
To record the test result as mg/L nonylphenol ethoxylate (10 EO), multiply the test result by 1.1.
To record the test result as mg/L Marlipal 24/60 (6 EO), multiply the test result by 1.2.
DR 1900: Go to All Programs>LCK or TNTplus Methods>Options to select the TNTplus number for the test. Other instruments automatically select the method from the barcode on the vial.
Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.
Dispose of reacted solutions according to local, state and federal regulations. Refer to the Safety Data Sheets for disposal information for unused reagents. Refer to the environmental, health and safety staff for your facility and/or local regulatory agencies for further disposal information.

Items to collect

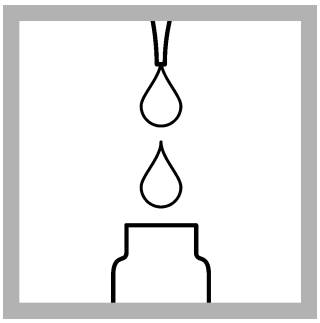
Description	Quantity
Nonionic surfactants TNTplus 875 Reagent Set	1
Pipet, adjustable volume, 1.0–5.0 mL	1
Pipet tips, for 1.0–5.0 mL pipet	1

Refer to Consumables and replacement items on page 3 for order information.

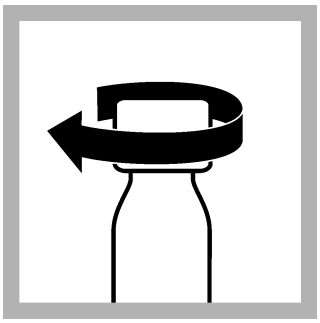
Sample collection and storage

- Collect samples in clean glass or plastic bottles.
- To preserve samples for later analysis, keep the samples at or below 6 °C (43 °F) for up to 48 hours.
- Let the sample temperature increase to room temperature before analysis.

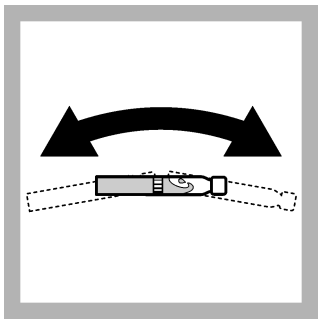
Test procedure



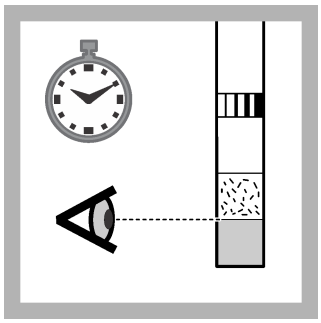
1. Use a pipet to add 2.5 mL of sample to the test vial.



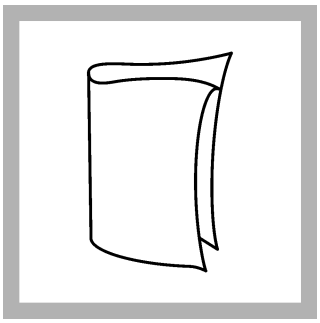
2. Tighten the cap on the vial.



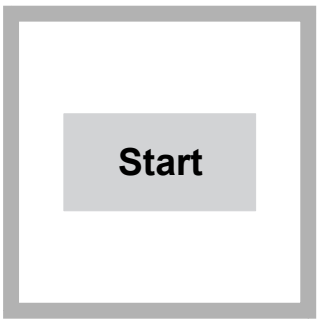
3. Hold the vial horizontally between the thumb and index fingers. Move the vial back and forth quickly (2 to 3 times each second) for 2 minutes. Do not shake the vial!



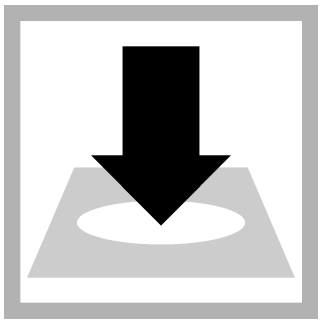
4. After 2 minutes, put down the vial. Do not move the vial until the phase separation is complete (approximately 2 minutes).



5. When the phase separation is complete, clean the vial.



6. DR 1900 only: Select program 875. Refer to Before starting on page 1.



7. Insert the vial into the cell holder. DR 1900 only: Push **READ**.
Results show in mg/L nonion. surf.

Interferences

Cationic surfactants have a positive interference and show results that are higher than actual.

Anionic surfactants have a negative interference and show results that are lower than actual. The interference increases with the concentration of the anionic surfactant. At anionic surfactant concentrations of 2.0 mg/L, the bias is approximately 10%. At anionic surfactant concentrations of 20 mg/L, the bias is approximately 40%.

The procedure does not measure APGs (alkyl polyglycosides).

To validate the test results, dilute the sample with a known volume of deionized water. Use the diluted sample in the test procedure and multiply the result by the dilution factor. As an alternative, spike the sample with a standard solution and compare the expected result to the actual result.

Table 2 shows the ions that were individually examined to the given concentrations and do not cause interference. No cumulative effects or influences of other ions were found.

Table 2 Examined ions

Ion	Concentration
K^+, Na^+, Cl^-	1000 mg/L
NH_4^+, SO_4^{2-}, NO_3^-, NO_2^-, Mg^{2+}	500 mg/L
Cu^{2+}, Ni^{2+}, Zn^{2+}	200 mg/L
Ca^{2+}, Al^{3+}	100 mg/L

Summary of Method

Nonionic surfactants (ethoxylates with 3–20 ether bridges) react with the indicator TBPE to form colored complexes, which are extracted in dichloromethane. The measurement wavelength is 606 nm.

Consumables and replacement items

Required reagents

Description	Quantity/Test	Unit	Item no.
Nonionic surfactants TNTplus 875 Reagent Set	1	25/pkg	TNT875

Required apparatus

Description	Quantity/test	Unit	Item no.
Pipet, adjustable volume, 1.0–5.0 mL	1	each	BBP065
Pipet tips, for 1.0–5.0 mL pipet	1	75/pkg	BBP068
Light shield, DR 3800, DR 2800, DR 2700	1	each	LZV646
Light shield, DR 3900	1	each	LZV849

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