Turbidity

DOC316.53.01332

Absorptometric Method[1]

Method 8237

21 to 1000 FAU

Scope and application: For water, wastewater and seawater.

[1] Adapted from FWPCA Methods for Chemical Analysis of Water and Wastes, 275 (1969).

Test preparation

Instrument-specific table

The table in this section shows all of the instruments that have the program for this test. Instrument specific information PP shows sample cell and orientation requirements for reagent addition tests, such as powder pillow or bulk reagent tests.

Table 1 Instrument-specific information for reagent addition

Instrument	Sample cell orientation	Sample cell
DR 900	The orientation mark is toward the user.	2401906 

Before starting

Install the instrument cap on the DR 900 cell holder before ZERO or READ is pushed.
For samples with high color or turbidity, use a filtered portion of sample instead of the deionized water for the blank.
Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used and use any recommended personal protective equipment.
Dispose of reacted solutions according to local, state and federal regulations. Use the Safety Data Sheets for disposal information for unused reagents. Consult the environmental, health and safety staff for your facility and/or local regulatory agencies for further disposal information.

Items to collect

Description	Quantity
Sample cells	2

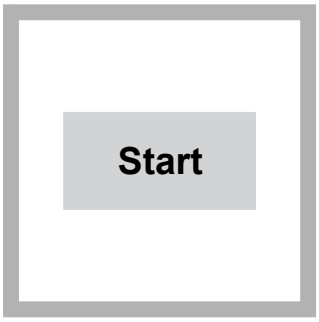
Refer to Consumables and replacement items on page 3 for reorder information.

Sample collection and storage

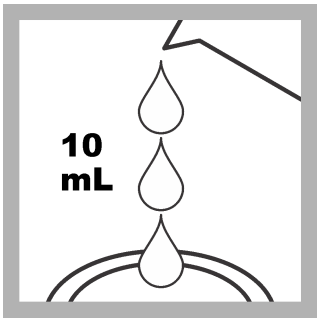
- Collect samples in clean glass or plastic bottles.
- To preserve samples for later analysis, keep the samples at or below 6 °C (43 °F) for up to 48 hours.
- Let the sample temperature increase to room temperature before analysis.

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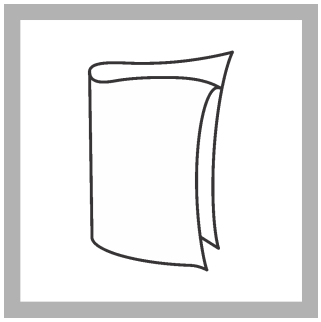
Absorbtometric method



1. Start program **745 FAU**.



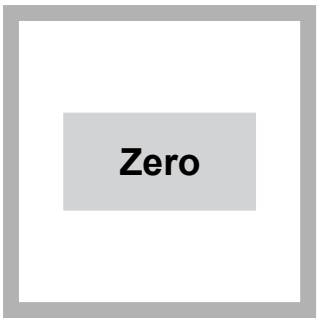
2. Prepare the blank: Fill a sample cell with 10 mL of deionized water.



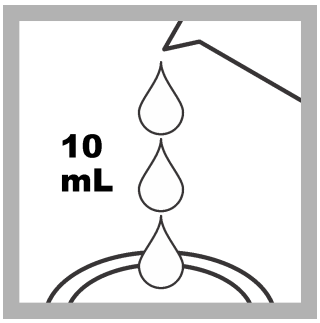
3. Clean the blank.



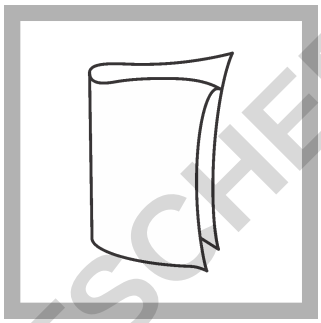
4. Insert the blank into the cell holder.



5. Push **ZERO**. The display shows 0 FAU.



6. Prepare the sample: Fill a second sample cell with 10 mL of sample.
Mix the sample well before it is added to the sample cell.



7. Clean the prepared sample.



8. Insert the prepared sample into the cell holder.



9. Push **READ**. Results show in Formazin Attenuation Units (FAU).

Interferences

Interfering substance	Interference level
Air bubbles	Interfere at all levels. Use the Degassing Kit or an ultrasonic bath to degas the samples.
Color	Interferes if the color absorbs light at the measurement wavelength.
Temperature extremes	May interfere by changing the turbidity of the sample. Analyze samples as soon as possible after collection. Analyze at the same temperature as the original sample.

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Accuracy check

Standard solution method

Use the standard solution method to validate the test procedure, reagents and instrument.

Items to collect:

- 4000 NTU Formazin Stock Solution
- 100-mL volumetric flask, Class A
- 5-mL volumetric pipet, Class A and pipet filler
- Deionized water

1. Prepare a 200 FAU formazin standard solution as follows:
   a. Use a pipet to add 5.00 mL of 4000 NTU formazin standard solution into the volumetric flask. As an alternative, use a 200 NTU StablCal™ Standard Solution.
   b. Dilute to the mark with deionized water. Mix well. Prepare this solution daily.
2. Use the test procedure to measure the concentration of the prepared standard solution.
3. Compare the expected result to the actual result.

   Note: *The factory calibration can be adjusted slightly with the standard adjust option so that the instrument shows the expected value of the standard solution. The adjusted calibration is then used for all test results. This adjustment can increase the test accuracy when there are slight variations in the reagents or instruments.*

Method performance

The method performance data that follows was derived from laboratory tests that were measured on a spectrophotometer during ideal test conditions. Users may get different results under different test conditions.

Program	Standard	Precision (95% Confidence Interval)	Sensitivity Concentration change per 0.010 Abs change
745	200 FAU	195–205 FAU	21 FAU

Summary of method

This turbidity test measures an optical property of the sample which results from scattering and absorption of light by particles in the sample. The amount of turbidity measured depends on variables such as the size, shape, color and refractive properties of the particles. This procedure is calibrated using formazin turbidity standards and the readings are in terms of Formazin Attenuation Units (FAU). This test cannot be used for USEPA reporting purposes, but it may be used for daily in-plant monitoring. One FAU is equivalent to one Nephelometric Turbidity Unit (NTU) of Formazin. However, the optical method of measurement for FAU is very different from the nephelometric (NTU) method (1 NTU = 1 FTU = 1 FAU when traced to formazin primary standards). Test results are measured at 520 nm.

Consumables and replacement items

Recommended standards and apparatus

Description	Quantity/test	Unit	Item no.
Formazin Stock Solution, 4000 NTU	1	500 mL	246149
Silicone Oil	1	15 mL DB	126936
StablCal Stabilized Turbidity Standard, 200 NTU	1	500 mL	2660449
Water, deionized	varies	4 L	27256

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Optional reagents and apparatus

Description	Unit	Item no.
Bath, ultrasonic	each	2489500
Bottle, wash, 250 mL	each	62031
Flask, volumetric, Class A, 100-mL	each	1457442
Flask, filter, 500 mL	each	54649
Filter holder	each	1352900
Filter pump, aspirator	each	213100
Oiling cloth, for applying silicone oil	each	2687300
Pipet filler, safety bulb	each	1465100
Pipet, volumetric 5.00-mL	each	1451537
Sample Degassing Kit	each	4397500
Stopper, rubber, one-hole, No. 7	6/pkg	211907
Tubing, rubber, 5/16-in. inside diameter	3.66 m (12 ft)	56019
Tweezers, plastic	each	1428200

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