# Color, ADMI

DOC316.53.01122

## ADMI Weighted Ordinate Method[1, 2] — Method 10048

## 5 to 1000 Pt-Co units[3]

**Scope and application:** For water and wastewater. Turbid samples are filtered during the analysis.

[1] Adapted from Allen, et al., 1972. Determination of color of water and wastewater by means of ADMI Color Values. *Proc. 28th Ind. Waste Conf.,* Purdue Univ., Eng. Ext. Ser. no. 142:661.
[2] Procedure is equivalent to Standard Method 2120 F.
[3] DR5000: 5 to 250 Pt-Co units

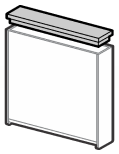
## Test preparation

### Instrument-specific information

Table 1 shows all of the instruments that have the program for this test. The table also shows the sample cell options and orientation requirements.

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

**Table 1 Instrument-specific information**

| Instrument | Sample cell orientation | 1-inch sample cell | 10-mm sample cell | 50-mm sample cell |
|---|---|---|---|---|
| DR6000 | The fill line is to the right (1-inch cell)<br>The clear side is to the right (10-mm, 50-mm cells) | 2495402   | 2095100  | 2629250  |
| DR5000<br>DR3900 | The fill line is toward the user (1-inch cell)<br>The clear side is toward the user (10-mm, 50-mm cells) | | | |

### Before starting

| |
|---|
| 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 |
|---|---|
| Beaker, 250 mL polypropylene | 2 |
| Cylinder, graduated, 100 mL polypropylene | 1 |
| Filtration apparatus: funnel/filter holder, 0.45 µm filter, flasks (2) and aspirator | 1 |
| pH meter with electrode | 1 |
| Sodium hydroxide or sulfuric acid solution, 10 N and 0.100 N | varies |
| Water, deionized | varies |
| Sample cells (For information about sample cells, adapters or light shields, refer to Instrument-specific information on page 1.) | 2 |

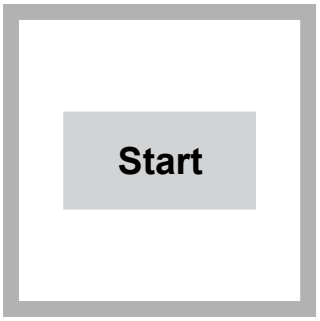
Refer to Consumables and replacement items on page 4 for order information.

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## Sample collection

- Collect samples in clean glass or plastic bottles with tight-fitting caps. Completely fill the bottle and immediately tighten the cap.
- Prevent agitation of the sample and exposure to air.
- Analyze the samples as soon as possible for best results.
- If immediate analysis is not possible, keep the samples at or below 6 °C (43 °F) for a maximum of 24 hours.
- Let the sample temperature increase to room temperature before analysis.

## Test procedure



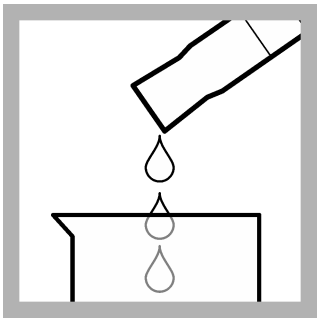

**1.** Start program

**96 Color ADMI 10 mm**

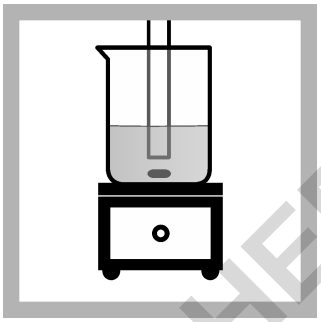
**97 Color ADMI 1 inch** or

**98 Color ADMI 50 mm**

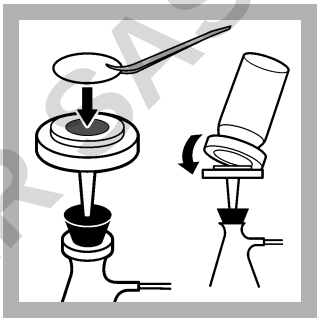
depending on the sample size. For information about sample cells, adapters or light shields, refer to Instrument-specific information on page 1.



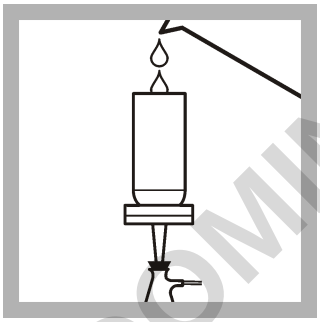
**2.** Pour 100 mL of sample into each of two beakers.



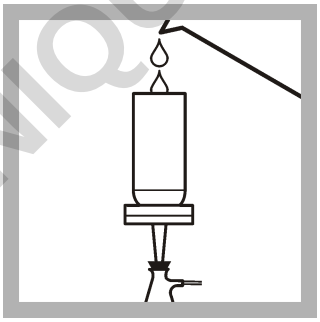
**3.** Adjust the pH of the sample in one of the beakers to pH 7.6 with a minimum volume of sodium hydroxide or sulfuric acid solution. Use a 10 N solution to make large pH adjustments and a 0.1 N solution to make small pH adjustments.
***Note:*** *Sodium hydroxide increases the pH value and sulfuric acid decreases the pH value.*



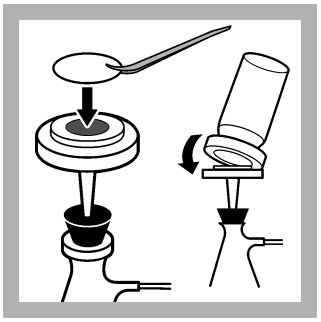
**4.** If the sample is turbid, set up the filtration apparatus (0.45 micron membrane filter, filter holder/funnel, filter flask, and aspirator). If the sample is not turbid, go to step 10.



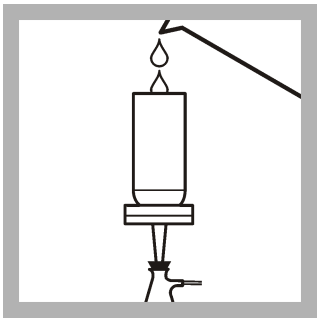
**5.** Pour approximately 50 mL of the original sample through the filter to rinse the filter. Discard the rinse water.



**6.** Pour the remaining 50 mL of original sample through the filter.
Write "original" on the flask.

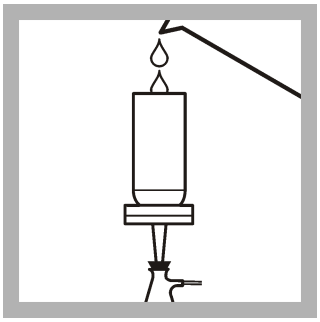


**7.** Install a clean filter flask for the pH-adjusted sample.

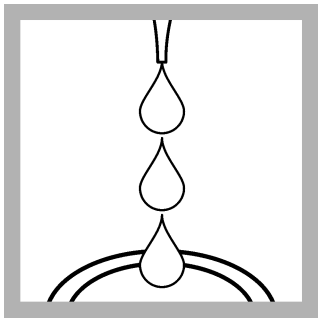


**8.** Pour approximately 50 mL of the pH-adjusted sample through the filter. Discard the rinse water.

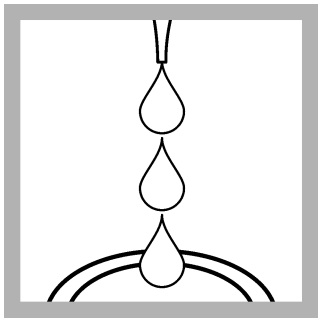
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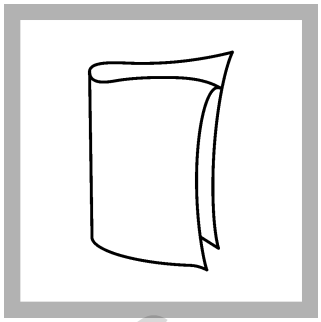
**9.** Pour the remaining 50 mL of pH-adjusted sample through the filter. Write "pH-adjusted" on the flask.



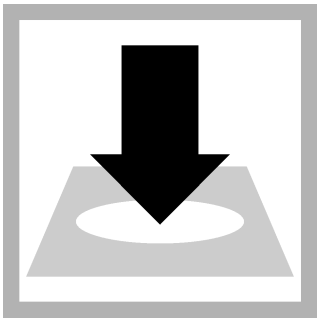
**10. Prepare the blank:** Fill a sample cell with deionized water.



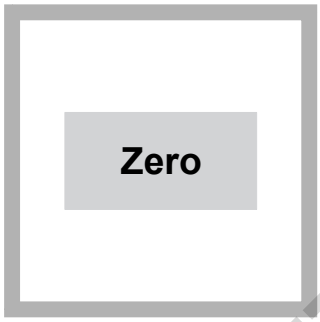
**11. Prepare the sample:** Fill a second sample cell with the pH-adjusted sample. Discard the remaining sample in the flask.



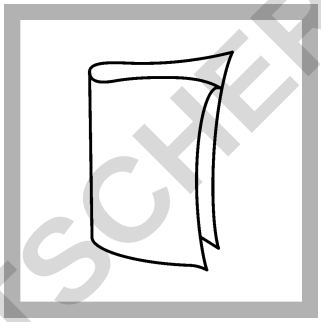
**12.** Clean the blank sample cell.



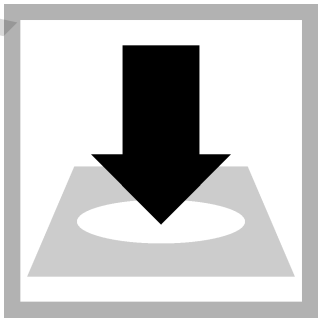
**13.** Insert the blank into the cell holder.




**14.** Push **ZERO**. The display shows the scan status, then 0 ADMI Value.



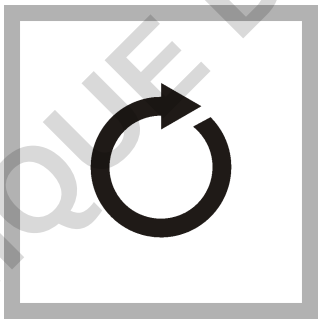
**15.** Clean the prepared sample cell.



**16.** Insert the prepared sample into the cell holder.




**17.** Push **READ**. Results show in ADMI Value.



**18.** Do steps 11 to 17 again for the original sample. For USEPA reporting, report both results.

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## Interferences

Turbidity interferes directly. The filtration steps in the test procedure remove turbidity.

## Accuracy check

### Standard solution method

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

Items to collect:

- Color standard solution, 500 platinum-cobalt units
- 100-mL volumetric flask, Class A
- 20-mL volumetric pipet, Class A and pipet filler

- Deionized water

1. Prepare a 100 platinum-cobalt units standard solution as follows:
   a. Use a pipet to add 20.00 mL of a 500 platinum-cobalt units standard solution into the volumetric flask.
   b. Dilute to the mark with deionized water. Mix well.
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 calibration 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 small variations in the reagents or instruments.*

## Summary of method

The three properties of color are hue, chroma and value. Hue is the color name, such as blue, red, green or yellow. Chroma is the color intensity (e.g., bright or dull). Value is how light or dark the color is. This method measures the color value independently of the hue and the chroma.

The sample transmittance is measured from 400 to 700 nm. The transmittance values are calculated to give a set of numbers for the color that is seen by typical humans. Further calculations give a single number for the color value. This number can be found on a scale used by the American Dye Manufacturers Institute (ADMI) for color value. The ADMI uses the platinum-cobalt standard from the American Public Health Association (APHA) as the standard for color value. Although this standard is yellow, the ADMI method is applicable to all hues.

## Consumables and replacement items

### Required reagents

| Description | Quantity/test | Unit | Item no. |
|---|---|---|---|
| Sodium Hydroxide Solution, 10 N | varies | 500 mL | 2545049 |
| Sodium Hydroxide Standard Solution, 0.100 N | varies | 1000 mL | 19153 |
| Sulfuric Acid, 10 N | varies | 1000 mL | 93153 |
| Sulfuric Acid Standard Solution, 0.100 N | varies | 100 mL MDB | 20232H |
| Water, deionized | varies | 4 L | 27256 |

### Required apparatus

| Description | Quantity/test | Unit | Item no. |
|---|---|---|---|
| Beaker, polypropylene, 250 mL | 2 | each | 108046 |
| Cylinder, graduated, polypropylene, 100 mL | 1 | each | 108142 |
| pH meter with electrode | 1 | each | HQ11d |

### Recommended standards

| Description | Unit | Item no. |
|---|---|---|
| Color standard solution, 500 platinum-cobalt units | 1 L | 141453 |

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### Optional reagents and apparatus

| Description | Unit | Item no. |
|---|---|---|
| Filter pump, aspirator | each | 213100 |
| Filter holder, magnetic | each | 1352900 |
| Filter membrane, 0.45 micron, 47 mm | 100/pkg | 1353000 |
| Flask, filtering, 500 mL | each | 54649 |
| Flask, volumetric, Class A, 100 mL | each | 1457442 |
| Pipet, volumetric Class A, 20 mL | each | 1451520 |
| Pipet filler, safety bulb | each | 1465100 |
| Stopper, rubber, one-hole, No. 7 | 6/pkg | 211907 |
| Tubing, rubber, 5/16-in. inside diameter | 3.66 m (12 ft) | 56019 |

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