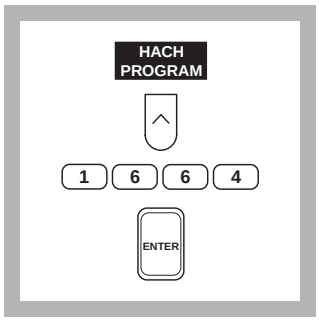
COLOR, Gardner

Method 10105 For transparent liquids

ASTM Method D 6166-97

(1 to 18 Gardner Color Units)



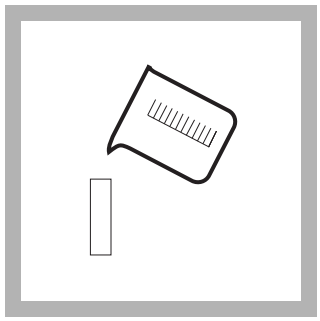
1. Press the soft key under ***HACH PROGRAM***. Select the stored program number for Gardner Color by pressing **1664** with the numeric keys.

Press **ENTER**.

2. The display will show:

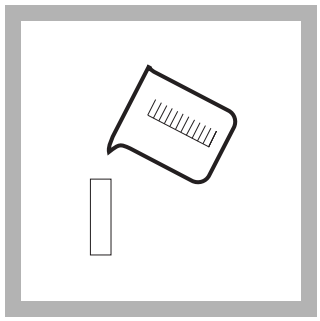
HACH PROGRAM: 1664 Color, Gardner

The starting wavelength (λ), 780 nm, is automatically selected.



3. Fill a 1-cm sample cell with the sample to be measured.

Note: *Other cell sizes may be used for very light-colored samples. Insert the appropriate cell holder and press the soft keys under* ***OPTIONS*** *and then* ***PATH****. Enter the path length of choice and press* **ENTER***. The display will indicate the selected cell path length in cm. The displayed results will be normalized to a 1-cm path length.*

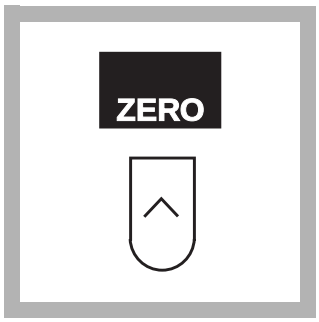


4. Fill another sample cell with the blank solution, if available.

Note: *The blank solution should match the sample in composition, but without any colored components.*

5. Insert a 1-cm cell adapter into the cell compartment. Place the blank into the 1-cm adapter. Close the light shield.

Note: *If a colorless blank solution is not available, leave the cell holder empty and close the light shield.*



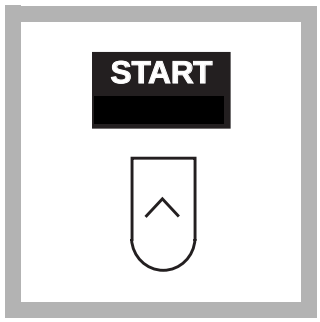
6. Press the soft key under ***ZERO***.

Starting at 780 nm, the instrument will establish 100% transmittance values for the blank at 5 nm intervals until it reaches 380 nm.

The display will show:

0.0 **Gardner Units**

7. When prompted, place the sample in the cell holder and close the light shield.



8. Press the soft key under ***START***.

Starting at 780 nm, the instrument will read the percent transmittance (%T) at 5 nm intervals until it reaches 380 nm. Once finished, the instrument will display the Gardner Color value of the sample.

Note: *To view tristimulus values or chromaticity coordinates, press the soft key under* ***OPTIONS****, then press* ***VIEW*** *repeatedly until* **TRISTIM** *or* **CHROM** *is displayed.*

Interferences

Turbidity interferes directly and must be removed by filtration. Samples containing fluorescent components may interfere. Temperature and pH should be controlled for consistent results. Bubbles will interfere and should be removed.

Sample Handling

The preparation of samples can significantly affect measured results. For increased accuracy, collect the sample in such a way that it is representative of the source, and prepare it using a standard method for the material being measured.

Accuracy Check

Perform the wavelength accuracy and absorbance checks described in *DR/4000 Spectrophotometer Instrument Manual*. The wavelength and absorbance accuracy of the instrument affect the bias and precision of the method. (See ASTM Method E 308-95.)

Summary of Method

This method determines the Gardner Color of a sample. Transmittance is measured from 380 to 780 nm and converted to tristimulus values and chromaticity coordinates using ASTM Method E308-95, CIE Illuminant C, and the CIE 1931 Standard 2° Observer. ASTM Method 6166-97 (the instrumental equivalent of

D1544-80) converts the chromaticity coordinates to a single number that indicates the Gardner Color.

Use this method for clear, yellow, or yellow-brown liquid samples only. Samples which are to be compared should be similar in appearance.

Safety

Good safety habits and laboratory techniques should be used throughout the procedure. Consult the *Material Safety Data Sheet* for information specific to the reagents used. For additional information, refer to Section *1*.

Pollution Prevention and Waste Management

For information on pollution prevention and waste management, refer to Section *1*.

REQUIRED EQUIPMENT AND SUPPLIES

Description	Quantity required per test	Unit	Cat. No.
DR/4000 1-cm cell adapter	1	each	48584-00
Sample cells, 1-cm, glass	2	each	20951-00

OPTIONAL EQUIPMENT AND SUPPLIES

Aspirator, vacuum	each	2131-00
Filter Holder, 47-mm, 300-mL graduated	each	13529-00
Filter, membrane, 47-mm, 0.45-microns	each	13530-00
Flask, filtering, 500-mL	each	546-49
Sample cell, 1-cm, quartz, w/ stopper (for volatile samples)	each	27401-01
Sample cells, 5-cm, quartz, w/ stopper (for volatile samples)	each	27401-05
Sample cells, 10-cm, quartz, w/ stopper (for volatile samples)	each	27401-10
Sample cells, microcell, 1-cm, 1.5-mL, disposable	100/pkg	26295-00
Sample cell adapter, 5-cm	each	48186-00
Sample cell adapter, 10-cm	each	48118-00
Sample cell adapter, microcell, 1-cm	each	48588-00
Stopper, No. 7, one hole	each	2119-07
Temperature Control Module, 15 to 50 °C, 1-cm cell holder	each	48070-08
Tubing, rubber	12 ft	560-19

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