

## Color Testing - Colorimeter 880/P > Replaced by 16-3175

ASTM D 156, ASTM D 1500, ASTM D 1544, ASTM D 6045, ASTM D 6166, ASTM E 308, ISO 2049, DIN 51411, DIN 51578 (obs.), FTM 791-0102 (obs.), IP 196, JIS K2580, NF M07-003, AOCS Cc13b, AOCS Cc13j

**Product group(s):** Fuel, Lubricant, Oil, Various, Wax

**User group(s):** Aviation Fuel, Benzene, Biodiesel, Biofuel, Diesel, Dyes, Engine Oil, Fuel, Fuel Oil, Gasoline, Gear Oil, Insulating Oil, Jet, Jet Fuel, Kerosene, Lubricant, Lubricating Oil, Mineral Oil, Naphtha, Oil, Paraffin, Solvent, Turbine Fuel, Various, Wax

**Scope:** The color determination is used mainly for manufacturing control purposes. It is an important quality characteristic. The color may serve as an indication of the degree of refinement or indicate a possible contamination.

A colorimeter automatically measures the color of transparent samples according to a defined color scale. Results will be displayed in terms of nominal color values, CIE values and spectral data.

Additional standards can be added by **Color Scale Upgrades Kits**.

If **heatable sample chamber** (<95°C) is integrated, it will keep solid samples, such as externally melted fat, wax or paraffine, in a liquid state during measurement. This requires cuvettes made of borosilicate glass.

For the **verification** of the colorimeter the sample will be replaced by certified colored glass filters or reference fluids.

**Reference Filters** allow quick and simple conformance checks.

**Reference Liquids** are suitable for routine calibration, test data verification and to ensure good inter-laboratory & inter-instrument correlation.

- **ASTM Color Scale**
- **Saybolt Color Scale**
- **Tristimulus Method**
- **CIE-Values & Spectral Data**
- **PC-Software available**
- **heated sample chamber available**

### Tristimulus Method

covers the automatic determination of the color according to ASTM & Saybolt Color Scale Method

### ASTM Color

for a wide range of petroleum products (incl. lubricating oils, heating oils, diesel oils etc.)

### Saybolt Color

for colorless to slightly yellowish petroleum products (incl. aviation fuels, kerosine, mineral oils, hydrocarbon solvents, petro-waxes etc.)

### AOCS-Tintometer® Color

a modified red & yellow version of the Lovibond® RYBN scale for pale to dark products (like oils, fats, edible oils & derivatives)

### Gardner Color

for pale yellow to red colored oils and chemicals (like resins, varnishes, drying oils, fatty acids etc.)



### **Automatic Colorimeter (880/P)**

for the examination of liquid samples (<40°C) in an optical glass cuvette

### **Automatic Colorimeter with a heatable sample chamber (880/P-H)**

for the examination of melted solid samples (<100°C) in a borosilicate glass cuvette.

Note: Reference filters or liquids may have to be ordered additionally to a color scale.

### **Technical Data**

Measuring Principle:	16 interference filters, 420 - 710 nm
Path length:	0.1 - 153 mm (0.004 - 6")
Illuminant:	C
Interfaces:	1 parallel for printer & 1 RS232 for PC
Dimensions (WxDxH):	515 x 195 x 170 mm
Weight:	7.8 kg

## Main Unit

<b>16-2175</b>	<p><b>Automatic Colorimeter 880/P</b>  <u>Tristimulus Method:</u> ASTM D 6045 (automatic ASTM &amp; Saybolt Color Scale)</p> <p><u>ASTM Color Scale:</u> ASTM D 1500 - JIS K2580 - IP 196 - ISO 2049          (former DIN 51 578 - FTM 791b-102 - NF T 60-104)</p> <p><u>Saybolt Color Scale:</u> ASTM D 156 - DIN 51 411 - JIS K2580 - NF M 07-003</p> <p><u>CIE Values:</u> (former ASTM E 308) X Y Z-tristimulus values, x y Y-chromaticity co-ordinates, L*a*b*-color space, DE-color difference</p> <p>Upgradeable with: <u>Gardner Color Scale:</u> ASTM D 1544 - ASTM D 6166  <u>AOCS-Tintometer Scale:</u> AOCS Cc13b - AOCS Cc13j</p> <p>An automatic combination of ASTM Petroleum Oil Comparator &amp; Saybolt Chromometer (ASTM D 6045 conform) with a wide measuring range (16 filters, max. path length 153 mm).</p> <p>Suitable for: fuel oil, diesel/gas oil, lubricating oil - aviation fuels, kerosine, mineral oil, solvent, various products</p> <p><u>Consisting of:</u>          Steel housing with solvent resistant enamel, 2-line LCD, membrane keypad, sample chamber and          - 2 color scales (ASTM - Saybolt)          - 4 CIE values          - spectral data: transmittance (full spectrum and at specified wavelengths)</p> <p><u>Supplied with:</u>          2 cuvettes, <b>optical glass</b> (1x 33 mm, 1x 100 mm)          1 reference filter, calibrated (Saybolt +10)          1 spare light bulb</p> <p>Power supply: 115 / 230 V, 50/60 Hz</p>
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<b>16-2176</b>	<p><b>Automatic Colorimeter 880/P-H</b>  <u>Like 16-2175 but:</u>          with heated sample chamber (max. 95 °C), therefore also suitable for <b>wax</b>          and 2 cuvettes, <b>borosilicate glass</b> (1x 33 mm, 1x 100 mm)</p> <p>Power supply: 115 / 230 V, 50/60 Hz</p>
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## Options & Accessories

<b>16-2177</b>	<p><b>PC-Software - Colorimeter (Windows®)</b></p>
<b>16-2169</b>	<p><b>Upgrade Kit - AOCS-Tintometer® Color Scale</b>          AOCS Cc 13b - AOCS Cc 13j          includes a scale release code &amp; a 5 1/4 inch cuvette (optical glass)</p>
<b>16-2168</b>	<p><b>Reference Filters - AOCS Color, set of 3</b>  <u>Nominal values (ISO 9001 certified):</u> 0.5R-1.0Y / 3.7R-13.0Y / 6.6R-50Y</p>
<b>16-2172</b>	<p><b>Cuvette, 5¼ inch, (L 134 x W 21 x H 40 mm), optical glass</b>          (AOCS-Tintometer®, Lovibond® RYBN Color)</p>
<b>16-2124</b>	<p><b>Cuvette, 5¼ inch (L 134 x W 21 x H 40 mm), borosilicate glass</b>          (AOCS-Tintometer®, Lovibond® RYBN Color)</p>

16-2196	<b>Upgrade Kit - Gardner Color Scale</b> ASTM D 1544 - ASTM D 6166 includes a scale release code & a 10 mm cuvette (optical glass)
16-2125	<b>Reference Filters - Gardner Color, set of 4</b> Nominal values (ISO 9001 certified): 2 / 8 / 12 / 17
16-2183	<b>Cuvette, 10 mm (L 10 x W 21 x H 40 mm), optical glass</b> (Gardner, Lovibond® RYBN Color)
16-2128	<b>Cuvette, 10 mm (L 10 x W 21 x H 40 mm), borosilicate glass</b> (Gardner, Lovibond® RYBN Color)
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16-2178	<b>Reference Filters - ASTM Color, set of 3</b> Nominal values (ISO 9001 certified): 0.5 / 3.5 / 5.0
16-2259	<b>Reference Liquid - ASTM Color (0.5)</b> 500 ml bottle, UKAS certificate, color stability about 1 year Nominal value (officially certified): 0.5
16-2260	<b>Reference Liquid - ASTM Color (1)</b> 500 ml bottle, UKAS certificate, color stability about 1 year Nominal value (officially certified): 1
16-2261	<b>Reference Liquid - ASTM Color (3)</b> 500 ml bottle, UKAS certificate, color stability about 1 year Nominal value (officially certified): 3
16-2262	<b>Reference Liquid - ASTM Color (5)</b> 500 ml bottle, UKAS certificate, color stability about 1 year Nominal value (officially certified): 5
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16-2179	<b>Reference Filters - Saybolt Color, set of 5</b> Nominal values (ISO 9001 certified): -8 / 0 / +10 / +18 / +25
16-2269	<b>Reference Liquid - Saybolt Color (-10)</b> 500 ml bottle, UKAS certificate, color stability about 1 year Nominal value (officially certified): -10
16-2266	<b>Reference Liquid - Saybolt Color (0)</b> 500 ml bottle, UKAS certificate, color stability about 1 year Nominal value (officially certified): 0
16-2267	<b>Reference Liquid - Saybolt Color (+12)</b> 500 ml bottle, UKAS certificate, color stability about 1 year Nominal value (officially certified): +12
16-2268	<b>Reference Liquid - Saybolt Color (+25)</b> 500 ml bottle, UKAS certificate, color stability about 1 year Nominal value (officially certified): +25

**Spare Parts**

<b>16-2181</b>	<b>Cuvette, 33 mm (L 33 x W 21 x H 40 mm), optical glass</b> (ASTM, Lovibond® RYBN Color)
<b>16-2182</b>	<b>Cuvette, 100 mm (L 100 x W 21 x H 40 mm), optical glass</b> (Saybolt, Pt-Co / Hazen / APHA, Lovibond® RYBN Color)
<b>16-2133</b>	<b>Cuvette, 33 mm (L 33 x W 21 x H 40 mm), borosilicate glass</b> (ASTM, Lovibond® RYBN Color)
<b>16-2134</b>	<b>Cuvette, 100 mm (L 100 x W 21 x H 40 mm), borosilicate glass</b> (Saybolt, Pt-Co / Hazen / APHA, Lovibond® RYBN Color)
<b>16-2180</b>	<b>Halogen Light Bulb (Tungsten) 5 V / 10 W</b>

**Order Guideline**

Minimum equipment: 1x 16-2175, Conformance filter, Reference liquid  
 Spares (approx. 1 year): Cuvettes  
 Additional requirements: