

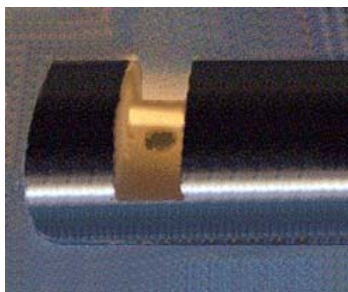
ClearView® SMART Photometer

Optical Solutions' brand ClearView photometer was originally designed to provide a low-cost means to measure color and turbidity using the flexibility of optical fibers to separate the analyzer from the sample cell or probe. This had two advantages:

- 1) The detector and electronics are not in contact with potentially hot pipes, as in site glass turbidity or color meters.
- 2) The probe can be removed and calibrated with a small amount of sample where site glass systems have no easy means of validating.

Turbidity and Color

With a special fiber optic turbidity probe, ClearView is able to quantitatively measure turbidity in the 0-900 NTU range using 90 degree off-axis light scattering inside large pipes and reactor vessels. The light beam is crossing the sample space. The small optic below the beam picks up the scattered light and ClearView converts the signal into NTU.



The initial emphasis on APHA color was extended to the measurement of fuel color in refineries and pipelines, including:

- Saybolt color in aviation fuel
- ASTM color in diesel fuel or gas oil
- Red dye concentration (ppm) for non-automotive diesel to comply with U.S. Internal Revenue Service taxation requirements

The picture bottom right is of an insertion probe contained in a safe retraction device measuring fuel color in France.



For North America
 Class 1, Div. 1 / 2 Groups B-D



ATEX, Europe EEx d II T6



Insertion Probe



ClearView® SMART Photometer

Capabilities

ClearView takes advantage of the patented ChemView technology with multiple detectors, each having a narrow (10-15 nm) optical filter selected for the wavelength of interest. As a result, we can place a Silicon detector tuned to APHA color at 450 nm in the visible (VIS) adjacent to an InGaAs detector tuned to water concentration at 1440 nm in the near-infrared (NIR) and measure them simultaneously. Therefore, ClearView evolved from just measuring color and turbidity at VIS wavelengths, to measuring composition in the NIR.

- Simultaneous measurement of color and % water
- Simpler NIR measurements
 - ◊ styrene in benzene
 - ◊ % water in organics
 - ◊ %water in acids
 - ◊ solvent mixtures (2-3 components)
 - ◊ ethylene or propylene gas

ClearView will NOT measure:

- UV (<390 nm)
- NIR wavelengths > 1650 nm (e.g. 100 ppm water)

In addition, ClearView compensates for:

- Sample temperature
(needed for NIR water measurements)
- Sample pressure
(needed for UV or NIR gas measurements)

by receiving RTD temperature or pressure transducer signals. Thus, you do not have to correct the readings in your process control computer.

Easy-to-Use Interface

The operator will mostly see the screens to the right on ClearView, indicating how easy the system is to use. Enter the coefficients from the calibration, display the predicted concentrations for color, scale the 4-20 mA analog outputs and continuously monitor your process.

MEASUREMENT MODE NTU 2.9 SAYBOLT 12.7				Measurement Mode Screen displays all answers
CONF	DIAG	ADJ	ABS	
ABSORBANCE VALUES 5975 2177 MV 455 98 MAU REFERENCES 670 3134 MV				Absorbance Screen shows the absorbances at all wavelengths used in the Coefficient Screen to determine chemical concentration. The reference voltage is a key diagnostic.
ZERO	CLR	HELP	EXIT	
MAIN CALIBRATION NAME: APHA GROUP A A0 = +0.00000E+00 T1 = +1.23450E-01 A2 = +0.34500E+00 455NM RF = +0.00000E+00 700NM				Coefficient Screen allows you to input coefficients for each wavelength, including sample temperature, to convert absorbances to chemical concentrations. Two types of calibrations are shown here. The upper screen shows a linear calibration with sample temperature compensation. The lower screen shows a polynomial calibration typically used for Saybolt color.
MAIN CALIBRATION NAME: SAYBOLT GROUP A S0 = +0.00000E+00 S1 = +1.23450E-01 S2 = +0.34500E+00 S3 = +5.00000E-01 S4 = +0.00000E+00				
NTU MA 4 = +0.0000E+00 20 = +2.0000E+01				Analog Output Screen scales your 4-20 mA output in concentration units for each answer.
INC	DEC	HELP	EXIT	

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ClearView® SMART Photometer

Specifications

Number of Detectors	Up to 4; 1 reference, up to 3 analyzing wavelengths
Lamp	Patented Optical Solutions' StabLamp with optical feedback, precision-mounted Tungsten-Halogen bulb; ~8 months bulb life nominal
Photometric Drift	<2 mAU over 2-3 weeks with ± 5 °C variation
Wavelength Drift	0.1 nm VIS typical 0.2 at 1450 nm
Dynamic Range	3.6 AU typical near 1450 nm (non-linearity <1% at 1.6 AU)
Enclosures	Adolet meeting C1D1 Groups B-D CorTem meeting ATEX II 2 G EEx d IIC T6
Outputs	2 self-powered, isolated 4-20 mA standard, 3 optional, 500 ohm load max. Two user-programmable opto-closures. One opto-closure pre-programmed for any fault. Large 3 x 4" LCD display controlled by 3 external buttons (C1D1) or magnetically activated pen (ATEX)
Inputs	One programmable discrete; One input for RTD or pressure transducer to correct for sample temperature or pressure variations
Fiber Optics	SMA 905 connectors standard 400-600 micron core fibers
Environmental	0 - 50 °C; 10-90% RH, non-condensing
Dimensions	C1D1 8" x 8" x 8.5" 20lbs (20 cm x20 cm x22 cm, 9 kg)
Power	24 VDC, <1A, (AC-DC converter supplied with unit for lab testing)

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