VIPER

17SXXXXX0

VIPER measures hyperspectral attenuation and transmission coefficients in the wavelength range of 360 nm and 750 nm, enabling detailed determination of multiple parameters at the same time. The light source is provided by 5 selected, energy-saving LEDs that Warranty a long service life and stable measurement data. VIPER can be used in different media as it is available in multiple path lengths, both in stainless steel or titanium housing.

Typical applications for VIPER are water quality monitoring, color measurements of aqueous solutions or quality monitoring of drinking water. Like all TriOS sensors, VIPER is equipped with a nano-coated optical window that protects from fouling. Additional parameters can be installed by means of software if necessary at a later time.

Benefits

- Without sampling and preparation of test samples
- Real time sensor
- Without reagents
- Optical window with nano coating
- LED technology

Applications

- Drinking water monitoring
- Environmental monitoring
- Colorimetry
- Quality assurance
- Petrochemical industry
- Industrial applications
- Food industry

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Technical Specifications

Measurement technology	light source	5 LED	
	detector	High-end miniature spectrometer, 256 channels	
		360 to 750 nm, 2.2 nm/pixel	
Measurement principle		Attenuation	
Optical path		10 mm, 50 mm, 100 mm, 150 mm, 250 mm	
Parameter		SAC_{436}	
		Pt-Co color scale (APHA/Hazen) (390 nm, 455 nm)	
		Colouring based on DIN EN ISO 7887-C (410 nm, 436 nm, 525 nm, 620 nm)	
		Cr-Co color scale (380 nm, 413 nm)	
Measuring range		0.01...2.5 AU (absorption units)	
Measurement accuracy		< 0.2 %	
Turbidity compensation		Yes	
Data logger		~ 2 GB	
T100 response time		2 min	
Measurement interval		≥ 1 min	
Housing material		Stainless steel (1.4571/1.4404) or titanium (3.7035)	
Dimensions (L x Ø)		495 mm x 48 mm (with 50 mm path)	~ 19.5˝ x 1.9˝ (with 50 mm path)
Weight	stainless steel	~ 2.4 kg (with 50 mm path)	~ 5.3 lbs (with 50 mm path)
	titanium	~ 1.3 kg (with 50 mm path)	~ 2.9 lbs (with 50 mm path)
Interface	digital	Ethernet (TCP/IP)	
		RS-232 or RS-485 (Modbus RTU)	
Power consumption		≤ 3 W	
Power supply		12...24 VDC (± 10 %)	
Maintenance effort		≤ 0.5 h/month (typical)	
Calibration/maintenance interval		24 months	
System compatibility		Modbus RTU	
Warranty		1 year (EU: 2 years)	US: 2 years

INSTALLATION

Max. pressure	with SubConn	30 bar	~ 435 psig
	with fixed cable	3 bar	~ 43.5 psig
	in FlowCell	1 bar, 2...4 L/min	~ 14.5 psig, 0.5 to 1.0 gpm
Protection type		IP68	NEMA 6P
Sample temperature		+2...+40 °C	~ +36 °F to +104 °F
Ambient temperature		+2...+40 °C	~ +36 °F to +104 °F
Storage temperature		-20...+80 °C	~ -4 °F to +176 °F
Inflow velocity		0.1...10 m/s	~ 0.33 fps to 33 fps

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Color measurement

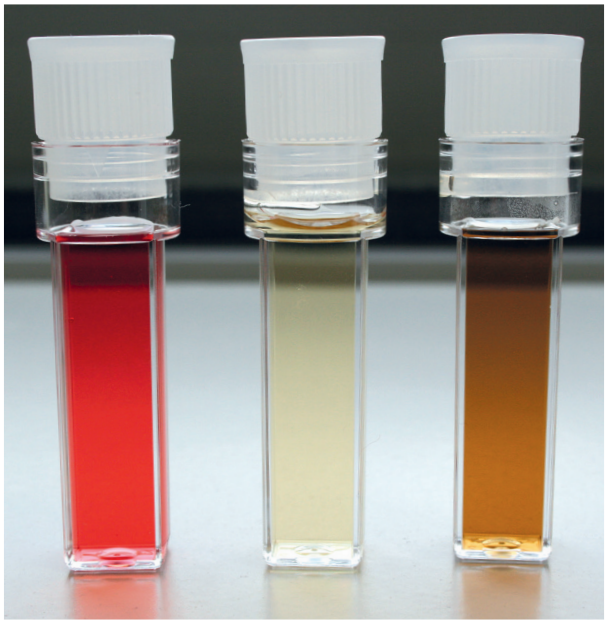
VIPER is an in-situ VIS photometer to determine the color of liquids. In addition to the hyperspectral recording of spectra (2.2 nm/pixel), various color indexes can be determined. This enables standardized, safe and objective measurements. Time-consuming and expensive sampling is eliminated through in-situ measurements. Additionally variations over a whole day can be recorded.

SAC_{436} (DIN EN ISO 7887-3 (2011))

Spectral absorption coefficients at 436 nm are designated SAC_{436}. It represents the light attenuation of an aqueous sample with a layer thickness of 1 m and a wavelength of 436 nm. The yellow to brown color ranges that occur in colored water have the highest light attenuation at 436 nm, which is why for example the coloring is determined according to drinking water regulations at this wavelength.

VIPER compensates any turbidity when determining the SAC_{436}.

Depending on the customer's request, SACs in the entire wavelength range (such as SAC_{525}, SAC_{620}) can be determined, or individual opacity adjustments can be made.



Pt-Co color scale (Hazen/APHA)

(DIN EN ISO 6271 (2005))

The Pt-Co scale number records the range from colorless (<1) to light yellow-orange (500). The color number is defined via a standard solution of hexachloroplatinate in acidic salt water and specified in mg/L Pt.

The Pt-Co color number is calculated from the turbidity-corrected attenuation at 455 nm or 390 nm.

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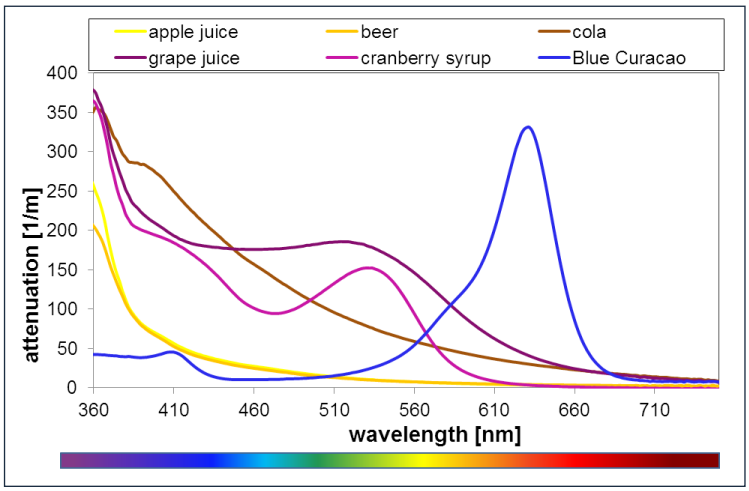
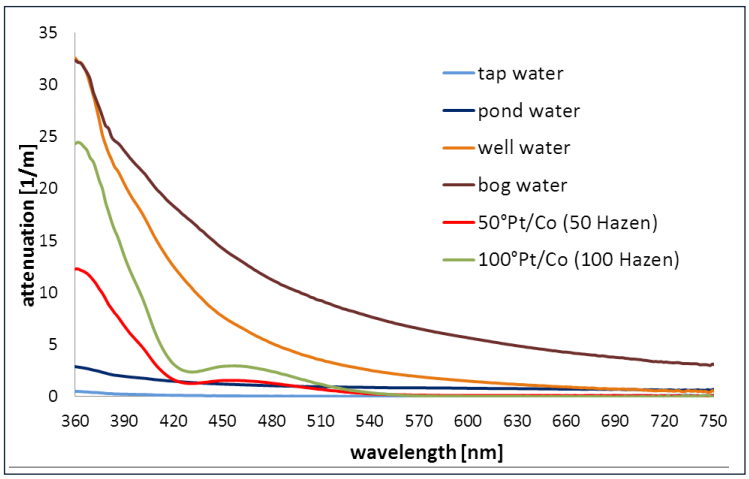


Coloring

VIPER enables hyperspectral measurements of color of all liquids.

This also allows the differentiation of colors that are perceived similarly, but consist of different color mixes.

The diagram on the left shows examples from the beverage industry.



VIPER: Attenuation spectrum

Subsequent calculation of color numbers is also possible thanks to the storage of spectra. Several color numbers can be simultaneously calculated from a spectrum. In addition to the mentioned color numbers, the device can determine the Cr-Co color number (Russian grade) in accordance with GOST 3351-74, which is interesting for the Russian market. Please contact us for any special applications. We will be happy to help.

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