Consistency in Colour Measurement

Accurate, efficient automatic colorimeter

Lovibond® PFX195

Dark Oils & Fats
Liquid Chemicals & Industrial Oils
Petroleum Oils & Fuels
Beers, Malts & Caramels
Pharmaceutical Solutions
Industrial Oils & Surfactants
Sugar Solutions, Syrups & Honey
Optically Clear Samples
Waters & Waste Waters

Lovibond® PFX195 Automatic Transmittance Colorimeter

- Consistent and reliable colour data
- Extensive yet flexible choice of standard colour scales
- Remote upgrade facility for adding scales once in service
- Allows calculation and description of off-hue status
- Gives closest match to stored references
- Generates a customised colour scale from reference samples
- Robust steel construction with excellent chemical resistance
- Ability to handle hot samples with high melting points
- Easy maintenance with removable sample chamber
- Includes a certified reference standard for conformance checks
- Supplied with colour control software for data analysis
- Output conforming to GLP including date, time, sample & user ID
- Accommodates a range of sample cells and tubes

Objective Colour Data at an Affordable Price

The Lovibond® PFX195 is an economical colorimeter for optically clear samples that meets the demand for consistent and reliable colour data. It removes all subjectivity involved in colour grading, supplying unbiased readings that are unaffected by operator or environment.

Comprehensive Selection of Standard Colour Values

PFX195 colorimeters automatically measure colour and display the results directly, either according to the traditional grading scales that have been widely adopted as industry standards for colour assessment and control, or in terms of internationally recognised CIE values and spectral data:

Colour Scale	References	Scope	Range
ADMI (full spectrum and tristimulus filter)	American Standard Methods 2120 E	Coloured waters and tinted liquids	
Acid Wash Colour	ASTM D848	Quality testing of industrial aromatic hydrocarbons	1 - 14
ASBC Color		American standard for colour grading of beers; derived from EBC Colour	1.2 - 10.6 (extended range by dilution and reduction in path length)
ASTM Color	ASTM D1500, D6045, ISO 2049	A wide range of petroleum products including lubricating oils, heating oils and diesel fuel oils	0.5 - 8 units
Chinese Pharmacopoeia Colour Series [1]	CP Appendix IX A	Pharmaceutical solutions	YG1 - 10; Y1 - 10; OY1 - 10; OR1 - 10; BR1 - 10
EBC Colour	Analytica	Beers, malts and caramels and similarly coloured liquids. Based either on absorption at 430 nm or CIE x y chromaticity co-ordinates	2 - 27 units (extended range by dilution and reduction in path length)
European Pharmacopoeia Colour Series	Ph. Eur. Method 2.2.2	Pharmaceutical solutions	R1 - 7; Y1 - 7; B1 - 9; BY1 - 7; GY1 - 7
FAC Colour	AOCS Cc 13a-43	Approved by the Fats Analysis Committee of the American Oil Chemists Society for grading dark coloured oils, fats and tallows.	1 - 45 (odd numbers)
Gardner Colour	ASTM D1544, D6166, AOCS Td 1a,	Chemicals and oils ranging from pale yellow to red, such as resins, varnishes, drying oils, lecithins and fatty acids	1 - 18 units
Hess-Ives Colour Units	DGK F050.2	Chemicals and surfactant liquids	
Honey Colour (Pfund Equivalents)		Commercial honeys, ranging from pale yellow through amber to deep red	0 - 115 mm
ICUMSA Colour	ICUMSA GS1-7, ICUMSA GS2/3-9	Sugar solutions & syrups	
Iodine Colour	DIN 6162	Solvents, plasticisers, resins, oils and fatty acids ranging from yellow to brown	1 - 500 units
Klett Colour (blue filter KS-42)	AOCS Dd 5-92	Detergents and surfactants	0 - 1000 units
Pt-Co/Hazen/APHA Scale	ASTM D1209, D5386	Water and other clear liquids such as plasticisers, solvents and petroleum spirits	0 - 500 mg Pt/l
Rosin, US Naval Stores [1]	ASTM D509	Rosins varying in colour from yellow to reddish orange	XC - D + FF
Saybolt Colour	ASTM D156, D6045, JIS K 2580	Light coloured petroleum products including aviation fuels, kerosine, white mineral oils, hydrocarbon solvents and petroleum waxes	-16 (darkest) to +30 (lightest)
Series 52 (Brown)		Beers, whiskies and sugar solutions	1 - 38 units
Yellowness Index [1]	ASTM D1925, E 313	Determination of the degree of yellowness under daylight illumination. Calculated from X Y Z tristimulus values	
US Pharmacopoeia Color	USP (631) Color and Achromicity	Pharmaceutical solutions	A - T
CIE Values	ASTM E308	X Y Z tristimulus values; x y Y chromaticity co-ordinates; CIE L*a*b* colourspace; ΔE colour difference; L*C*h colour space[2], Hunter L a b colour space[2]	Defined by spectrum locus
Spectral data (420 - 710 nm)		Transmittance (full spectrum and at specified wavelengths) Optical density (full spectrum and at specified wavelengths)	0 - 100% 0 - 2.5

[1] These scales are not included on standard instrument versions but are available as a colour scale upgrade [2] included as standard on PFX195C only

Versatile and Flexible Application

The Lovibond® PFX195 is configured as a series of industry-focused instruments, each including the principal colour scales used in that sector:

Version	Application	Standard Colour Scales
PFX195/1	Liquid chemicals & industrial oils	Pt-Co/Hazen/APHA, Gardner, Iodine, CIE values, spectral data
PFX195/2	Petroleum oils & fuels	Saybolt, ASTM Color, Pt-Co/Hazen/APHA, CIE values, spectral data
PFX195/3	Dark oils & fats	FAC, Gardner, CIE values, spectral data
PFX195/4	Beers, malts & caramels	EBC (CIE & 430 nm), ASBC (CIE & 430 nm), Series 52 (Brown), CIE values, spectral data
PFX195/5	Pharmaceutical solutions	European Pharmacopoeia (includes automatic selection of colour series), US Pharmacopoeia, Pt-Co/Hazen/APHA, CIE values, spectral data
PFX195/6	Industrial oils & surfactants	Klett Colour (blue filter KS-42), Pt-Co/Hazen/APHA, Hess-Ives Colour Units, CIE values, spectral data
PFX195/7	Sugar solutions, syrups & honey	ICUMSA Colour (420, 560, 710 nm), Honey Colour (Pfund Equivalents), Series 52 (Brown), CIE values, spectral data
AquaTint	Waters & waste waters	ADMI (spectral & tristimulus filter methods), Pt-Co/Hazen/APHA, CIE values, spectral data
PFX195C	Transparent samples	CIE values (standard selection), L*C*h colour space, Hunter L a b colour space, spectral data

Colour scale upgrades give the flexibility to meet individual requirements, enabling additional colour scales to be added to standard instrument versions, either at the time of order or remotely once the instrument is in service. For product types that are incompatible with standard colour scales, the PFX195 allows users to build up a customised scale from a series of reference samples and then to obtain a closest match to the stored references.

Colour Testing Made Simple

The Lovibond® PFX195 is an easy to use, automatic instrument that requires no special skills to operate. The built-in menu guides users through the selection of operating parameters such as colour scale. Thereafter, readings are made with a single key press, taking less than 25 seconds to complete.

Easily Customised to User Specifications

Adaptable software and design allow users to configure the PFX195 to their requirements. Operators can set the language for display, program the PFX195 to show only those scales of interest or restrict access to the menu system. As well as standard colorimetry cells, the PFX195 can be used with a range of tubes and standard, flow-through and disposable spectrophotometer cells.

Calculation and Description of Off-Hue Status

The PFX195 off-hue status is a useful facility that reveals whether the sample colour is characteristic of the selected scale. It includes a description of hue difference (eg. redder, greener), relative saturation (stronger or weaker) and an off-hue factor (a relative measure of the distance away in colour space of the sample colour from the 'true' colour scale).

Suited to Laboratory or Production Environments

Comprehensive facilities for colour management make the Lovibond® PFX195 an ideal choice for the laboratory. However, with excellent calibration stability, password protection for tamper proof control and simple operation, the PFX195 also supports the migration of quality control to the manufacturing area, making it a cost-effective option for dedicated production testing. For easy maintenance, the Lovibond® PFX195 includes a robust steel sample chamber, which is simply removed and cleaned if a spillage occurs, and the precision filament lamp is easily assessed and changed from outside the instrument.

Optimised Use of Colour Data

Data sets can be saved in the instrument, printed out or automatically downloaded to a PC computer where they can be processed and stored for future analysis, traceability and monitoring trends. The colour control software supplied with the PFX195 enables the generation of spectral and CIE diagrams as well as analysis of spectral data. It also permits direct control of the instrument from the computer.

Confidence in Colour Measurement

For regular conformance checking each PFX195 is provided with a calibrated glass filter of known colour value. Sets of conformance filters and certified colour reference solutions are also available for routine calibration and verification of test data. Conformance filters are supplied with a Certificate of Conformity stating their colour values and confirming that they have been manufactured and inspected under the control of Tintometer's ISO 9001: 2000 quality system. Certified colour reference solutions are supplied with full traceability to internationally recognised standards, either ISO/IEC 17025:2000 (ASTM Color, Saybolt and Gardner Colour) or the ISO 9001: 2000 quality system (Pt-Co Units).

Technical Specification

Measuring principle	9 interference filters
Spectral response	420 - 710 nm
Bandwidth	20 nm
Repeatability	
- chromaticity (x y)	± 0.0004
- transmittance	± 0.5 %
Measurement time	Less than 25 seconds
Calibration	Single key press; fully automated
Light source	5 Volt, 10 Watt tungsten halogen lamp (lens ended)
Illuminant	CIE Illuminant A, C, D65 (B for PFX195/4)
Observer	2º, 10º
Path length	0.1 - 50 mm
Interfaces	Parallel printer port, RS 232 port
Data storage	Up to 32 data sets
Input voltage	Universal (190 - 240V), via external power supply
Approvals	CE
Display	2 x 40-character, back-lit LCD
Keypad	21 key membrane keypad; washable polyester with audible feedback
Instructions	7 languages - English, French, German, Spanish, Italian, Portuguese & Dutch
Instrument housing	Fabricated steel with tough, textured paint finish
Dimensions	Width 435 mm, depth 195 mm, height 170 mm
Weight	6.8 kg

Accessories supplied

Each Lovibond® PFX195 is supplied complete with Windows® software, optical glass cells for the colour scales included, a certified glass filter of specified colour value for regular conformance testing, a spare lamp and instructions.

Version	Optical Glass Cells*	Conformance Filter
PFX195/1	2 x 10 mm, 1 x 50 mm	Pt-Co 150, Gardner 4
PFX195/2	1 x 33 mm, 1 x 50 mm	ASTM Color 3.5
PFX195/3	3 x 10 mm	FAC 9
PFX195/4	1 x 10 mm, 2 x 25 mm	EBC 7.5
PFX195/5	1 x 40 mm, 1 x 50 mm	EPY4
PFX195/6	1 x 10 mm, 1 x 20 mm, 1 x 40 mm, 1 x 50 mm	Pt-Co 150
PFX195/7	1 x 10 mm, 1 x 25 mm, 1 x 50 mm	Pfund 30
AquaTint	2 x 50 mm	Pt-Co 150
PFX195C	2 x 10 mm, 1 x 20 mm	x 0.34, y 0.36, Y 84.5

* Whenever cells are subjected to thermal shock, it is recommended that borosilicate glass cells be used.




For information on colour measurement, visit our website at www.tintometer.com

ORDERING INFORMATION

	Order Code
PFX195 Instruments	
PFX195/1 (Pt-Co, Gardner, Iodine)	1
PFX195/2 (Saybolt, ASTM Color, Pt-Co)	2
PFX195/3 (FAC, Gardner)	13 19 53
PFX195/4 (EBC (CIE & 430 nm), ASBC (CIE & 430 nm), Series 52)	13 19 54
PFX195/5 (EP Colour (includes auto selection), USP, Pt-Co)	13 19 55
PFX195/6 (Klett Colour (blue filter KS-42), Pt-Co, Hess-Ives)	13 19 56
PFX195/7 (ICUMSA (420, 560, 710 nm), Honey Colour, Series 52)	13 19 57
AquaTint (ADMI (spectral & tristimulus filter methods), Pt-Co)	13 19 59
PFX195C (full range of CIE values)	13 19 58
Colour Scale Upgrades (include required cell)	
Acid Wash Colour (ASTM D848)	13 29 50
ASTM Color	13 28 40
Chinese Pharmacopoeia	13 28 50
Gardner Colour	13 28 60
Hess-Ives Colour Units	13 28 70
Klett Colour (blue filter KS-42); order with instrument only	13 29 30
Pt-Co/Hazen/APHA scale	13 28 80
Rosin, US Naval Stores	13 28 90
Saybolt Colour	13 29 00
Yellowness Index	13 29 10
CIE L*C*h	13 29 20
Spares & Optional Accessories	
PFX195 Lamp 5V	13 81 80
Replacement sample chamber	13 28 30
Holder for standard spectrophotometer cells (12.5 mm width)	13 19 07
Adapter for 10.65 mm tubes	13 28 00
Adapter for 33 mm tubes	13 28 10
Tube, 10.65 mm diameter	35 22 90
Tube, 33 mm diameter for ASTM Color	35 23 00
Acid Wash Tube	35 22 20
Dark sample cell for CIE Values, 1 mm path length (W600/OG/10 mm cell with a 9 mm spacer)	13 28 20
Plastic, disposable cells, 10 mm path length, pack of 100 *	13 27 70
Plastic, disposable cells + lids, 50 mm path length, pack of 10 *	13 27 80
Plastic, disposable cells, 50 mm path length, pack of 50 *	13 27 90
Flow through control software (for use with PC)	13 29 40
Flow through cell, 50 mm path length *	65 80 10
Flow through cell, 10 mm path length *	65 80 20
PFX195 IQ/OQ Documentation	13 22 00
4 - 20 mA adaptor, 4 channels	(please request details)
* For use with holder for standard spectrophotometer cells	
Conformance Filters (nominal values quoted)	
ASTM Color, set of 3 filters (0.5, 3.5, 5.0)	13 95 10
EBC Colour, set of 5 filters (4, 9.5, 15, 18, 25)	13 94 00
FAC Colour, set of 5 filters (7, 13, 15, 29, 39)	13 97 00
Gardner Colour, set of 4 filters (2, 8, 12, 17)	13 95 60
EP Red, set of 2 filters (R2, R6)	13 94 10
EP Yellow, set of 2 filters (Y2, Y4)	13 94 20
EP Brown, set of 2 filters (B2, B5)	13 94 30
EP Brown/Yellow, set of 2 filters (BY3, BY5)	13 94 40
EP Green/Yellow, set of 2 filters (GY2, GY5)	13 94 50
Honey Colour (Pfund Equivalents), set of 5 filters (15, 30, 60, 85, 100)	13 93 70
Klett (blue filter KS-42), set of 5 filters (21, 66, 162, 318, 616)	13 97 10
Pt-Co/Hazen/APHA, set of 5 filters (5, 20, 50, 100, 300)	13 93 80
Saybolt Colour, set of 5 filters (-8, 0, +10, +18, +25)	13 93 90
US Pharmacopoeia, set of 3 filters (G, H, P)	13 94 60
Single filter, certificated (select scale & nominal value from above)	10 99 70
User specified filter (specify scale and value)	10 99 80
Certified Reference Materials, 500 ml (nominal values quoted)	
ASTM Color <0.5, (certified to ISO/IEC 17025)	13 42 90
ASTM Color 1, (certified to ISO/IEC 17025)	13 40 00
ASTM Color 3, (certified to ISO/IEC 17025)	13 40 10
ASTM Color 5, (certified to ISO/IEC 17025)	13 40 20
ASTM Color 7, (certified to ISO/IEC 17025)	13 40 30
Gardner Colour 2, (certified to ISO/IEC 17025)	13 42 00
Gardner Colour 5, (certified to ISO/IEC 17025)	13 42 10
Gardner Colour 8, (certified to ISO/IEC 17025)	13 42 20
Pt-Co 5 mg Pt/l, certified under ISO 9001 quality system	13 41 40
Pt-Co 10 mg Pt/l, certified under ISO 9001 quality system	13 41 50
Pt-Co 15 mg Pt/l, certified under ISO 9001 quality system	13 41 60
Pt-Co 30 mg Pt/l, certified under ISO 9001 quality system	13 41 70
Pt-Co 50 mg Pt/l, certified under ISO 9001 quality system	13 41 80
Pt-Co 100 mg Pt/l, certified under ISO 9001 quality system	13 41 90
Pt-Co 500 mg Pt/l (certified to ISO/IEC 17025)	46 28 03
Saybolt Colour -10, (certified to ISO/IEC 17025)	13 40 40
Saybolt Colour 0, (certified to ISO/IEC 17025)	13 40 50
Saybolt Colour +12, (certified to ISO/IEC 17025)	13 40 60
Saybolt Colour +25, (certified to ISO/IEC 17025)	13 40 70

The Tintometer Ltd • Lovibond House • Solar Way • Solstice Park • Amesbury • SP4 7SZ • UK • Tel: +44 (0)1980 664800 • Fax: +44 (0)1980 625412
Email: sales@tintometer.com • Website: www.tintometer.com