Lovibond® Colour Measurement

Tintometer® Group

PFXi-195/8

Colour Measurement for Waters & Waste Waters

- Integrated RCMSi Technology for Remote Calibration
- Automatic and Non-subjective Colour Measurement
- Consistent Data Compliant with International Standards
- Very Rugged, Chemically Resistant, Steel Construction

Part Number: 1371958

Integrated RCMSi Technology for Remote Calibration

The PFXi series of spectrophotometric colorimeters introduces a unique concept in liquid colour control: RCMSi technology (Remote Calibration & Maintenance Service via internet). You can now benefit from the capability for remote calibration and servicing via the internet - eliminating any costs and time delays associated with servicing and guaranteeing compliance with standards.
Watch the RCMSi video to see how easy the procedure is.

Automatic and Non-subjective Colour Measurement

The PFXi range provides absolute results. Automatic instruments communicate in clear terms, accurately and reliably with no opportunity for human error or misjudgement.

Consistent Data Compliant with International Standards

The PFXi range automatically measures colour and displays 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.

Very Rugged, Chemically Resistant, Steel Construction

The robust steel construction enables you to use the PFXi even in the harshest of environments.

Easy Maintenance with Removable Sample Chamber

The instruments include a robust steel sample chamber which is easily removed so you can clean it or replace it should spillage occur.

Extensive and Flexible Choice of Colour Scales

You can choose from a selection of over 20 different, internationally recognised scales in a variety of combinations.

Remote Upgrade Facility

Uniquely, however, you do not need to make the choice of scales at point of purchase. The PFXi instruments are upgradeable in the field - so you can add a scale at a later date.

Calculation and Description of "Off-Hue" Status

This is a useful facility that enables you to reveal whether the sample colour is characteristic of the selected scale. Where appropriate, 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).

Supplied with Colour Control Software for Data Analysis

The software allows you to generate spectral and CIE diagrams as well as analyse spectral data. It also permits direct control of the instrument from the computer.

Conformance Standard, Cells and Spare Bulb Included

For regular conformance checking, certified colour reference standards are also available for routine calibration and verification of test data. Conformance filters are supplied with a Certificate of Conformity - giving you the assurance of their colour values and confirmation that they were manufactured under the control of The Tintometer Ltd's ISO 9001 quality system.

Output Conforming to GLP Including Date, Time, Sample & User ID

The adaptable software and design allow you to configure the PFXi-195 to your requirements. You can set the display language, program the instrument to only display the scales of interest and restrict access to the menu system.

Accommodates a Wide Range of Sample Cells and Tubes

As well as standard colorimetry cells, the PFXi-195 can be used with a range of tubes and standards, flow-through and disposable spectrophotometer cells.

Extensive range of accessories

A thermal printer, sample chamber, additional cells, replacement lamps and conformance filters represent some of the additional accessories you can obtain for the PFXi-195.

Note: When dealing with materials such as fats and waxes whose temperature needs to be maintained at a constant temperature +10°C above the "Cloud Point" of the material, the PFXi-880, -950 & -995 series should be considered. These are available with an additional critical feature, an optional integrated heater unit.

Industry

Chemical Industry | Food and Beverage Industry | Industries Others | Oil and Gas | Pharmaceutical Industry

Application

Waste Water Treatment

PFXi-195/8

The PFXi series of spectrophotometric colorimeters introduces a unique concept in liquid colour control: RCMSi technology. You can benefit from the capability for remote calibration and servicing via the internet - saving the cost and time associated with servicing and guaranteeing compliance with standards.

The PFXi range is supplied with a full range of colour scales for specific markets including, but not limited to, Petroleum, Edible Oils, Pharmaceuticals, Brewing and Honey. Users can upgrade scales remotely at any time.

Note: When dealing with materials such as fats and waxes whose temperature needs to be maintained at a constant temperature +10°C above the "Cloud Point" of the material, the PFXi-880, -950 & -995 series should be considered. These are available with an additional critical feature, an optional integrated heater unit.

Technical Data

Applicable Standard	APHA 2120 ASTM D1209 ASTM E308 ISO 6271
Colour Type	Transparent
Display	240 x 128, back-lit graphic display, (white on blue)
Path Length	0.1 - 50 mm
Measuring Geometrics	0° - 180° Transmission
Interfaces	USB RS 232 Ethernet
Detector	blue enhanced photodiode
Internal Storage	100,000+ Messungen
Power Supply	Universal (90 - 240 VAC), via external power supply
Measuring Principle	9 interference filters
Measurement Time	less than 30 seconds
Sample Chamber	max 50mm cells
Keypad	23 key tactile membrane keypad; washable polyester with audible feedback
Instrument Housing	Fabricated steel with tough, textured paint finish
Spectral Range	420 - 710 nm
Bandwidth	10 nm
Repeatability	±0.0004 (CIE xy Chromaticity) on measurements of de-ionised water
Baseline Calibration	Single key press; fully automated
Illuminants	CIE Illuminant A CIE Illuminant B CIE Illuminant C CIE Illuminant D65
Portability	Benchtop
Observer	2°, 10°
Compliance	CE RoHS WEEE
Languages User Interface	English, German, French, Italian, Portuguese, Spanish, Russian, Chinese, Japanese
Dimensions	435 x 170 x 195 mm
Weight	6.8 kg

Delivery Scope

- PFXi Series Instrument
- External Power Supply
- Set of 3 Power Leads (UK, European and United States)
- USB and LAN Cable
- Quick Start Guide
- CD ROM (Containing Windows® Control Software and Manuals)
- RCMSi Starter Pack
- Certificate of Conformity
- Accessory Box with 5 Volt Halogen Lamp, Conformance Filter, 1 x W600/OG/10 Cell, 1 x W600/OG/50 Cell

Accessories

Title	Part Number
Holder for standard spectrophotometer cells (12.5 mm width)	131907
Adapter for 10.65 mm tubes	132800
Adapter for 33 mm tubes	132810
Dark sample cell for CIE values, 1 mm path length	132820
Replacement Sample Chamber	133830
RCMSi Certified Calibration Pack - Full	134410
RCMSi Certified Calibration Pack - Conformance	134420
RCMSi Certified Calibration Pack - Starter	134430
PFXi IQ/OQ Documentation	137680
Flow through control software	137690
PFXi Thermal Printer	137891
PFXi Lamp 5V	138180
Tube, 10.65 mm diameter	352290
Tube, 33 mm diameter for ASTM Color	352300
Flow through cell, 50 mm path length	658010
Flow through cell, 10 mm path length	658020

Lovibond® Colour Measurement

Tintometer® Group

Colour Management for Industry

Lovibond® PFX*i*-195 Series

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

Accurate, efficient spectrophotometric colorimeters

www.lovibondcolour.com

Lovibond® PFX*i*-195 Series

- RCMSi Remote Calibration & Maintenance Service via internet
- USB & LAN Interface
- Large clear LCD screen for ease of use and ability to display graphs and data in a wide variety of languages
- 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
- Easy maintenance with removable sample chamber
- 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 for Process Control

The Lovibond® PFX*i*-195 Series is a highly efficient 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

The PFX*i*-195 Series of 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	1 – 500
Acid Wash Color	ASTM D848	Quality testing of industrial aromatic hydrocarbons	1 – 14
ASBC		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; OY – 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 Color	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 Color	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 Color 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 Pfund
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 Color (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 Color	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 PFX*i*-195/9 only

Version	Application	Standard Colour Scales
PFX*i*-195/1	Liquid chemicals & industrial oils	Pt-Co/Hazen/APHA, Gardner, Iodine, CIE values, spectral data
PFX*i*-195/2	Petroleum oils & fuels	Saybolt, ASTM Color, Pt-Co/Hazen/APHA, CIE values, spectral data
PFX*i*-195/3	Dark oils & fats	FAC, Gardner, CIE values, spectral data
PFX*i*-195/4	Beers, malts & caramels	EBC (CIE & 430 nm), ASBC (CIE & 430 nm), Series 52 (Brown), CIE values, spectral data
PFX*i*-195/5	Pharmaceutical solutions	European Pharmacopoeia (includes automatic selection of colour series), US Pharmacopoeia, Pt-Co/Hazen/APHA, CIE values, spectral data
PFX*i*-195/6	Industrial oils & surfactants	Klett Color (blue filter KS-42), Pt-Co/Hazen/APHA, Hess-Ives Color Units, CIE values, spectral data
PFX*i*-195/7	Sugar solutions, syrups & honey	ICUMSA Colour (420, 560, 710 nm), Honey Colour (Pfund Equivalents), Series 52 (Brown), CIE values, spectral data
PFX*i*-195/8	Waters & waste waters	ADMI (spectral & tristimulus filter methods), Pt-Co/Hazen/APHA, CIE values, spectral data
PFX*i*-195/9	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 PFX*i*-195 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.

RCMSi Technology (Remote Calibration & Maintenance Service via internet)

The PFX*i* range includes new RCMSi technology (Remote Calibration & Maintenance Service via internet). This unique feature allows a calibrated measurement to be taken using an ISO 17025 certified liquid standard. The spectral response is transmitted to the Lovibond® secure calibration server. On completion of this procedure, a traceable calibration certificate is made electronically available to the user. The RCMSi system not only gives the user added confidence that the instrument is working within tight ISO standards but also reduces the need for expensive on-site servicing and preventative maintenance of the unit.

Colour Testing Made Simple

The PFX*i*-195 Series provides easy to use, automatic instruments that require 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 20 seconds to complete. Built-in help files are available.

Easily Customised to User Specifications

Adaptable software and design allow users to configure the PFX*i*-195 Series to their requirements. Operators can set the language for display, program the PFX*i*-195 to show only those scales of interest or restrict access to the menu system. As well as standard colorimetry cells, the PFX*i*-195 can be used with a range of tubes and standard, flow-through and disposable spectrophotometer cells.

Calculation and Description of Off-Hue Status

The PFX*i*-195 off-hue status is a useful facility that reveals whether the sample colour is characteristic of the selected scale. Where appropriate, 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 PFX*i*-195 Series an ideal choice for the laboratory. However, with excellent calibration stability, password protection for tamper proof control and simple operation, the PFX*i*-195 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® PFX*i*-195 Series includes a robust steel sample chamber, which is simply removed and cleaned if a spillage occurs, and the precision filament lamp is easily accessed 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 where they can be processed and stored for future analysis, traceability and trend monitoring. The colour control software supplied with the PFX*i*-195 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, certified colour reference standards 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 The Tintometer Ltd's ISO 9001 quality system. Certified colour reference standards are supplied with full traceability to internationally recognised standards, either ISO/IEC 17025 (ASTM Color, Saybolt and Gardner Color) or the ISO 9001 quality system (Pt-Co Units).

Lovibond® PFX*i*-195

PFX*i*–195 Technical Specification

Measuring principle	9 interference filters
Spectral response	420 – 710 nm
Bandwidth	10 nm
Repeatability	on measurements of de-ionised water
Chromaticity (x y)	+/– 0.0004
ΔE	0.4
Measurement time	Less than 30 seconds
Baseline calibration	Single key press; fully automated
Light source	5 Volt, 10 Watt Tungsten Halogen
Illuminants	CIE Illuminant A, B, C, D65
Observer	2°, 10°
Path length	0.1 – 50 mm
Interfaces	USB, LAN, RS232
Data storage	100,000+ Measurements
Input voltage	Universal (90 – 240 Vac), via external power supply
Compliance	CE, RoHS, WEEE
Display	240 x 128, back-lit graphic display, (white on blue)
Keypad	23 key tactile membrane keypad; washable polyester with audible feedback
Languages	English, French, German, Italian, Portuguese, Russian, Spanish, Chinese and Japanese
Instrument housing	Fabricated steel with tough, textured paint finish
Dimensions	Width 435, depth 195, height 170 (mm)
Weight	6.8 kg

Accessories

Version	Optical Glass Cells
PFX*i*-195/1	1 x 10 mm, 1 x 50 mm
PFX*i*-195/2	1 x 33 mm, 1 x 50 mm
PFX*i*-195/3	1 x 10 mm
PFX*i*-195/4	1 x 10 mm, 1 x 25 mm
PFX*i*-195/5	1 x 40 mm, 1 x 50 mm
PFX*i*-195/6	1 x 10 mm, 1 x 40 mm, 1 x 50 mm
PFX*i*-195/7	1 x 10 mm, 1 x 50 mm
PFX*i*-195/8	1 x 10 mm, 1 x 50 mm
PFX*i*-195/9	1 x 10 mm

* Whenever cells are subjected to thermal shock, only borosilicate glass cells should be used.

Ordering Information   Order Code

PFX*i*-195 Instruments

PFX*i*-195/1 (Pt-Co, Gardner, Iodine)	1371951
PFX*i*-195/2 (Saybolt, ASTM Color, Pt-Co)	1371952
PFX*i*-195/3 (FAC, Gardner)	1371953
PFX*i*-195/4 (EBC (CIE & 430 nm), ASBC (CIE & 430 nm), Series 52)	1371954
PFX*i*-195/5 (EP Colour (includes auto selection), USP, Pt-Co)	1371955
PFX*i*-195/6 (Klett Color (blue filter KS-42), Pt-Co, Hess-Ives)	1371956
PFX*i*-195/7 (ICUMSA (420, 560, 710 nm), Honey Colour, Series 52)	1371957
PFX*i*-195/8 (ADMI (spectral & tristimulus filter methods), Pt-Co)	1371958
PFX*i*-195/9 (full range of CIE values)	1371959

Colour Scale Upgrades (include required cell)

Acid Wash Color (ASTM D848)	132950
ASTM Color	132840
Chinese Pharmacopoeia	132850
Gardner Color	132860
Klett Color (blue filter KS-42); order with instrument only	132930
Pt-Co/Hazen/APHA scale	132880
Rosin, US Naval Stores	132890
Saybolt Colour	132900
Yellowness Index	132910
CIE L*C*h	132920

Many other Scale Upgrades are available.
Please contact sales@tintometer.com for details.

Spares & Optional Accessories

PFX*i*-195 Lamp 5V	138180
Replacement sample chamber	133830
Holder for standard spectrophotometer cells (12.5 mm width)	131907
Adapter for 10.65 mm tubes	132800
Adapter for 33 mm tubes	132810
Tube, 10.65 mm diameter	352290
Tube, 33 mm diameter for ASTM Color	352300
Acid Wash Tube	352220
Dark sample cell for CIE Values, 1 mm path length (W600/OG/10 mm cell with a 9 mm spacer)	132820
Plastic, disposable cells, 10 mm path length, pack of 100 *	132770
Plastic, disposable cells, 33 mm path length, pack of 50 *	352091
Plastic, disposable cells, 50 mm path length, pack of 50 *	352101
Flow through control software (for use with PC)	137690
Flow through cell, 50 mm path length *	658010
Flow through cell, 10 mm path length *	658020
PFX*i*-195 IQ/OQ Documentation	137680

* For use with holder for standard spectrophotometer cells

Conformance Filters (nominal values quoted)

EBC Colour, set of 5 filters (4, 9.5, 15, 18, 25)	139400
FAC Color, set of 5 filters (7, 13, 15, 29, 39)	139700
EP Red, set of 2 filters (R2, R6)	139410
EP Yellow, set of 2 filters (Y2, Y4)	139420
EP Brown, set of 2 filters (B2, B5)	139430
EP Brown/Yellow, set of 2 filters (BY3, BY5)	139440
EP Green/Yellow, set of 2 filters (GY2, GY5)	139450
Honey Colour (Pfund Equivalents), set of 5 filters (15, 30, 60, 85, 100)	139370
Klett (blue filter KS-42), set of 5 filters (21, 66, 162, 318, 616)	139710
US Pharmacopoeia, set of 3 filters (G, H, P)	139460
Single filter, certificated (select scale & nominal value from above)	109970
User specified filter (specify scale and value)	109980

Certified Reference Materials, 500 ml (nominal values quoted)

ASTM Color <0.5, (certified to ISO/IEC 17025)	134290
ASTM Color 1, (certified to ISO/IEC 17025)	134000
ASTM Color 3, (certified to ISO/IEC 17025)	134010
ASTM Color 5, (certified to ISO/IEC 17025)	134020
ASTM Color 7, (certified to ISO/IEC 17025)	134030
Gardner Color 2, (certified to ISO/IEC 17025)	134200
Gardner Color 5, (certified to ISO/IEC 17025)	134210
Gardner Color 8, (certified to ISO/IEC 17025)	134220
Pt-Co 5 mg Pt/l, certified under ISO 9001 quality system	134140
Pt-Co 10 mg Pt/l, certified under ISO 9001 quality system	134150
Pt-Co 15 mg Pt/l, certified under ISO 9001 quality system	134160
Pt-Co 30 mg Pt/l, certified under ISO 9001 quality system	134170
Pt-Co 50 mg Pt/l, certified under ISO 9001 quality system	134180
Pt-Co 100 mg Pt/l, certified under ISO 9001 quality system	134190
Pt-Co 500 mg Pt/l, (certified to ISO/IEC 17025)	462803
Saybolt Color -10, (certified to ISO/IEC 17025)	134040
Saybolt Color 0, (certified to ISO/IEC 17025)	134050
Saybolt Color +12, (certified to ISO/IEC 17025)	134060
Saybolt Color +25, (certified to ISO/IEC 17025)	134070
Service pack for RCMSi	137380

SGS UKAS GB92/852   UKAS CALIBRATION 0630 ISO 17025