

MW, BB, BD, KF, PE, TH, FK, CY, CD, CF, SG, BA, VC, WR, WT, CS

Технические характеристики

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Moisture

Grain Moisture Analyser MC2000

OHAUS®

Hand held, grain moisture analyser designed to accurately determine whole grain moisture content in agricultural Q.C. and storage applications.

- ◆ Simple operation with easy-to-use controls and touch keypad operation
- ◆ Fast, reliable results within 5 seconds and automatically temperature compensated to ensure accuracy
- ◆ Multiple measurement modes with 10 pre-programmed and 40 user customisable procedures available allowing use with a wide variety of grains
- ◆ Backlit LCD readout enable use in low-light areas such as barns or silos

| | |
|---------------------------|--|
| Model | MC2000 |
| Moisture range, % | 3 to 45 |
| Readability, % | 0.1 |
| Repeatability, % | ±0.2 |
| Sample volume, ml | 220 |
| Operating temperature, °C | 0 to 50 |
| Display modes | % moisture, weight, density, statistics, temperature |
| Procedure memories | 50 (10 pre-programmed) |
| Power | 4 x 1.5V AA batteries |
| Overall, W x D x H mm | 190 x 120 x 200 |
| Weight, empty kg | 0.8 |

As described. Supplied with sample measure, leveller/lid, carrying case, 4 x 1.5V AA batteries and instructions.

MW030-10 MC2000

BL610-15 Spare battery, 1.5V AA (4 required)



MW030-10

Moisture

Halogen Moisture Analysers, MB Series

OHAUS®

Choice of four models with low-cost, routine (MB-23 and MB-25), or sophisticated (MB-90 or MB-120) features for laboratory or industrial applications in the chemical, pharmaceutical, food and beverage, and environmental fields.

◆ MB-120 has a built-in, statistical function mode for process analysis and output

| Model | MB-23 | MB-25 | MB-90 | MB-120 |
|-----------------------------|---|---|---|---|
| Ranges x readability | | | | |
| weighing, g | 0 to 110 x 0.01 | 0 to 110 x 0.005 | 0 to 90 x 0.001 | 0 to 120 x 0.001 |
| moisture, % | 0 to 100 x 0.1 | 0 to 100 x 0.05 | 0 to 100* x 0.01 | 0 to 100* x 0.01 |
| temperature, °C | 50 to 160 x 5 | 50 to 160 x 5 | 50 to 160 x 1 | 40 to 230 x 1 |
| time, minutes | 1 to 99 x 0.5 (up to 60min.) x 1 (rest of range) | 1 to 99 x 0.5 (up to 60min.) x 1 (rest of range) | 1 to 480 x 0.5 (up to 60 min.) x 1 (rest of range) | 1 to 480 x 0.5 (up to 60 min.) x 1 (rest of range) |
| Repeatability | 0.1%/0.01g | 0.05%/0.005g | 0.02%/0.002g | 0.01%/0.001g |
| Results display | Moisture content, time, temperature, weight | Moisture content, time, temperature, weight | Moisture content, time, temperature, weight, method name, drying curve and statistics | Moisture content, Dry weight, Regain, grams or custom, method name, drying curve and statistics |
| Shut off modes | Manual, timed 1 to 99 min. x 30 secs. (up to 60 min., 1 min. rest of range), Auto | Manual, timed 1 to 99 min. x 30 secs. (up to 60 min., 1 min. rest of range), Auto | Manual, timed or Auto | Manual, timed, Autofree %/s, Autofree mg/s, Auto 30, Auto 60 and Auto 90 |
| Temperature profiles | Standard only | Standard only | Standard and fast | Standard, fast, ramp, step (user defined) |
| Memory | — | — | 2 methods, 100 test results per method | 100 methods, 1000 test results per method |
| Calibration | | | | |
| weight, g | 50 | 50 | 50 | 50 |
| temperatures, °C | 100 and 160 | 100 and 160 | 100 and 160 | 100 and 160 |
| Data interface | RS232 printer/PC port | RS232 printer/PC port | USB and RS232 printer/PC port with GMP/GLP functions | USB and RS232 printer/PC port with GMP/GLP functions |
| Weighing pan | mm 90 diameter | 90 diameter | 90 diameter | 90 diameter |
| Overall, W x D x H | mm 170 x 280 x 130 | 170 x 280 x 130 | 210 x 350 x 180 | 210 x 350 x 180 |
| Weight | kg 5.8 | 5.8 | 5.3 | 5.3 |

*0 to 999% in regain mode.

Moisture Analysers MB-series

As described. With heating as indicated, sample pan handler, USB and bi-directional RS232 interfaces, aluminium foil sample dishes, levelling feet and bubble, and instructions. For 100-120V, 220-240V 50/60Hz single phase supplies.

- MW178-15** MB-23, infra-red heating
- MW178-25** MB-25, halogen heating
- MW180-15** MB-90 halogen heating
- MW180-20** MB-120, halogen heating

BB528-14



Accessories and spares for all models

Dot matrix printer, SF40A

Multifunction, dot matrix printer. Supplied with RS232C interface cable, software and adapter to fit Ohaus laboratory balances, paper roll, ribbon cartridge and a.c. adapter for 100-240V 50/60Hz a.c.

- BB528-14** Printer SF40A
- BB528-28** Paper rolls for BB528-14, pack of 5
- BB528-29** Ink ribbon for BB528-14, pack of 1

- MW183-06** TempCal temperature calibration kit
- BD790-04** Aluminium foil sample dishes, 90 x 8mm, pack of 50
- BD790-06** Aluminium foil sample dishes, 90 x 8mm, pack of 80
- BD790-12** Aluminium foil sample dishes, 100 x 7mm, pack of 80



MW178-25 in use, **MW178-15** is similar



MW180-15



MW180-20

Petroleum

Karl Fischer Coulometric Titrator, Aquamax KF Plus

Portable moisture titrator for the rapid and accurate determination of the low concentrations of water in a wide range of materials. Features include easy operation, "ACE" automatic error compensation, up to 10 user-programmable methods stored in the memory, rechargeable battery for field operation, built-in thermal printer and multi-lingual display/print out. Results are available in ppm, mg/kg, % and g water. Suitable for moisture analysis within standards ASTM D1533, D4928, D6304, IP386, APIMPMS chapter 10.9 and BS60814.

Karl Fischer Coulometric Titrator, Portable, Aquamax KF Plus

As described. Complete with titration vessel, generator electrode with frit, drying tube, molecular sieve, stirrer bar, injection septa, 1ml syringe with needle, built-in printer, rechargeable battery, 12V d.c. vehicle adapter, and instructions.

KF200-10 Aquamax KF Plus

Spares and accessories

KF203-04 Generator electrode (with frit)

KF203-08 Detector electrode

KF203-12 Titration vessel

KF203-16 Injection septa, pack 10

KF203-20 Thermal printer paper, roll

KF203-40 Carrying case

Reagent packs

With 8 x 100ml anode, 1 x 50ml cathode reagents and filling funnel.

KF203-54 Aquamax KF Frit* for use with frit or diaphragm-type generator electrodes

KF203-56 Aquamax KF Oil* to ASTM, API, EI and ISO. With anode reagent pre-cut with Xylene.

***Please note:** these items are classed as hazardous material for export and require packing/shipping as such.

| | |
|---|---|
| <i>Measuring ranges possible typical moisture</i> | 1 g to 200mg water 1 g to 10mg water 1ppm to 100% |
| <i>Maximum sensitivity</i> | 0.1 g |
| <i>Sample analysis rate</i> | 2.024g/minute |
| <i>Maximum current</i> | 400mA |
| <i>Start or end delay</i> | 0 to 30 minutes (selectable) |
| <i>Drift correction</i> | Automatic |
| <i>Precision</i> | ±3 g (10 to 100 g) ±3 g (100 g to 1mg) ±0.3% (>1mg) |
| <i>Calculation modes</i> | w/w, weight/dilution (all user-programmable) ratio, volume/density, v/v, with sample i.d. and time/date stamp |
| <i>Statistics (up to 99 runs)</i> | Maximum, mean, minimum values |
| <i>Output</i> | Serial port |
| <i>Power supply</i> | 90 - 264V 47/63Hz a.c. or 12V d.c. |
| <i>Dimensions, H x W x D</i> | 290 x 255 x 130mm |
| <i>Weight</i> | 3kg |



KF200-10

Petroleum

Comparators, Gardner 3000/AF650

ASTM D1500-IP196: BS2049: BS5859; ISO2049; FIMS791C 102; NF T60-104; JIS K2580, ASTM D1544-68 (74); A.O.C.S. Td1A-64 and Ka3-63; DIN/ISO 4630.

Lovibond® Gardner 3000/AF360 Comparators

For the visual determination of the colour of a wide variety of petroleum products, natural and synthetic drying oils, varnishes, lacquers and resins, using colour glass standards which can be set at the two limiting values of a specification, making it easy to see if a sample falls between them.

Operate on the 3-field principle whereby the sample can be viewed between 2 adjacent steps on the colour scale. ABS, fire-retardant plastic housing, with standard halogen light source, timed lighting adjustable in one-minute periods by repeatedly pressing the switch for the required number of minutes operation and low-voltage power supply. Front mounted control knobs operate the two discs, each with 8 colour glass standards. A replaceable white chamber insert ensures consistent background colour throughout operational life. Supplied with glass sample/reference containers, colour standard discs and mains adapter for the illuminator requiring a 120V, 240V 50/60Hz single phase supply. Overall 231 x 233 x 142mm W x D x H. Weight 1.5kg.

PE240-50 Comparator, AF228, Gardner 3000 resin scale version

PE240-55 Comparator, AF650, Petroleum version (ASTM D1500, ASTM D6045, ISO2049, IP196)

Colour Comparator

For routine colour grading of a wide range of liquids – see CS100 *et. seq.* in the *Colorimeter section*.

Electronic Colorimeters, PFXi-195

Low cost spectrophotometric colorimeters for consistent, reliable, automatic, electronic measurement of colour for specific dedicated applications involving liquids or transparent solids. Ideal for routine analysis and quality control.

- ◆ Choice of instrument versions with international colour scales:
 - Pt-Co/Hazen/APHA, Gardner, Iodine
 - Saybolt, ASTM colour, Pt-Co/Hazen/APHA
 - FAC, Gardner
 - EBC (CIE and 430nm), ASBC (CIE and 430nm) Series 52 (Brown)
 - Ph. Eu., USP, Pt-Co/Hazen/APHA
 - Klett colour (KS-42 blue filter), Honey colour (Pfund equivalents), Series 52 (Brown)
 - ADMI (spectral and tristimulus filter methods), Pt-Co/Hazen/APHA
 - CIE values (stand selection), L*C*h colour space, Hunter lab colour space, Judd rgb
- ◆ 9 built-in interference filters with automatic selection
- ◆ Operator prompting in choice of 9 languages - English, French, German, Spanish, Italian, Portuguese, Russian, Chinese and Japanese
- ◆ RS232, USB and LAN outputs
- ◆ Supplied with Windows™-based control/downloading/analysis software which also enables the generation of spectral and CIE programmes

Technical Specification

| | | |
|---|-----------|--|
| <i>Spectral response</i> | <i>nm</i> | 420 to 710 |
| <i>Band width</i> | <i>nm</i> | 20 |
| <i>Repeatability (using deionised water):</i> | | |
| <i>Chromaticity (x,y):</i> | | ±0.0004 |
| <i>E:</i> | | 0.04 |
| <i>Calibration</i> | | Single key press |
| <i>Light source</i> | | 5V, 10W tungsten halogen lamp |
| <i>Illuminant</i> | | CIE illuminant A, C, D65 (B for PFXi195/4) |
| <i>Sample chamber</i> | <i>mm</i> | 0.1 to 50 path length cells |
| <i>Outputs</i> | | RS232, USB, LAN |
| <i>Data storage</i> | | 100,000 measurements |
| <i>Power requirement</i> | | 90-240V 50/60Hz single phase supplies |
| <i>Overall W x D x H</i> | <i>mm</i> | 435 x 195 x 170 |
| <i>Weight</i> | <i>kg</i> | 6.8 |

Colorimeter PFXi-195/1

For liquid chemicals and industrial oils analysis.

Scales: Pt-Co/Hazen/APHA, Gardner, Iodine.

Cells supplied: 1 x 10mm, 1 x 50mm path length.

CS725-15 PFXi-195/1

Colorimeter PFXi-195/2

For liquid chemicals and industrial oils analysis.

Scales: Saybolt, ASTM colour, Pt-Co/Hazen/APHA.

Cells supplied: 1 x 33mm, 1 x 50mm path length.

CS725-25 PFXi-195/2



PE240



CS725

Petroleum

Distillation of Petroleum Products

ASTM D86; D216 (Obsolete); D447 (Obsolete); D850; D1078; E133; IP123; IP191 BS2000; IP195; EN3405; BS2000 Pts. 123, 191 195; BS658; BS7392; ISO198; FTMS791 1001; NFM07-002 (Obsolete); JIS K2254.

For determining the distillation characteristics of petroleum products (Distillation Groups 0 to 4).

Distillation Apparatus, Setastill

For left-handed operation. Electrically heated. Range: ambient to +400°C. With shield, condenser unit, double glazed safety viewing window, heater with controller and indicator. The thermally lagged condenser bath is fitted with connections for an external heater/chiller fluid circulator. Condenser unit: 370 x 250 x 470mm W x D x H, distillation unit: 210 x 210 x 470mm W x D x H. Weight 12kg. Requires, but does not include, accessory flask boards for operation. For 100-240V 50/60Hz single phase supplies. Without glassware, support boards or thermometers.

PE295-16 Setastill, left-hand operation

PE295-40 Condenser lid, with thermometer support and receiver stand

PE295-44 Seta-Orbis Digistill digital thermometer and datalogger for 200-240V 50/60Hz a.c. supplies

PE295-48 Flexible stopper caps for flask side-arm, pack 10

PE295-52 Thermometer centring device for rimmed flask neck

TH414-72 Thermometer IP75C. Required for Setastill condenser

Flask support boards, glass ceramic, for PE295 series

152 x 152mm. Dimension stated is hole diameter.

PE297-10 25mm

PE297-16 32mm

PE297-22 38mm

PE297-26 50mm

PE297-32 70mm

Mercury Thermometers

Under the requirements of Annex XVII of EC552/2009 REACH Regulation, mercury thermometers cannot be sold to the General Public within the UK or EU.

Typical equipment required for various test methods

All methods require a distillation unit either PE290-10 or PE295-16 plus the following items:

ASTM D86 - IP123 - BS 2000 Part 123; DIN 51 751; ISO 3405:

FK527-26 Distillation flask 125ml

CY750-10 Receiver 100ml, 3400/04

PE297-22 Heat resistant board, 38mm hole

Thermometers ASTM7C/IP5C, ASTM7F, ASTM8C/IP6C or ASTM8F.

ASTM D216 - IP 191 - BS 2000 Part 191:

FK527-26 Distillation flask 125ml

CY750-10 Receiver 100ml, 3400/04

PE297-16 Heat resistant board, 32mm hole

Thermometers ASTM7C/IP5C or ASTM7F.

ASTM D447:

FK527-26 Distillation flask 125ml

CY750-10 Receiver 100ml, 3400/04

Thermometer ASTM8F.

ASTM E133:

FK527-26 Distillation flask 125ml

FK527-30 Distillation flask 250ml

CY750-10 Receiver 100ml, 3400/04

PE297-22 Heat resistant board, 38mm hole

PE297-32 Heat resistant board, 70mm hole

Thermometers ASTM2C, 7C, 8C, 8F, 37C, 38C, 39C, 40C, 41C, 42C, 102C, 104C, 106C or 107C.

Distillation Flasks – see *Flasks* section.

Distillation Receivers – see *Cylinders* section.

Thermometers ASTM/IP – see *Thermometers* section.

Multi-Test verification and calibration materials for ASTM D86 and IP123 are available – *details on request*.



PE295-16 with PE295-40, PE295-44 and glassware

Petroleum

Flash Point – Pensky-Martens

Closed cup method to:

ASTM D93 – IP 34; E502; IP35; IP404; EN22719; BS2000 Pts. 35 and 404; ISO2719; AASHTO T73-811; NF M07-019; JIS K2265; FTMS 791b 1102.

Manual Tester

Pensky-Martens Flash Tester, Closed Cup

Comprising a stainless steel case with heater, bath with cup, lid and shutter assembly. The main power switch and heater controller are mounted on the front panel. The test flame is fuelled from an LPG cylinder via the accessory gas valve, or it can be connected to a mains gas supply. The stirrer motor incorporates a choice of two drive outputs for the flexible drive connection providing the option of stirrer speed for either Method A or Method B of the Test Procedure. Overall 310 x 290 x 320mm W x D x H. Weight 7.1kg. For 220-240V 50/60Hz single phase supplies. Without LPG cylinder.

PE350-10 Pensky-Martens closed

PE353-08 Ferrule/adaptor to mount cup thermometer, pack of 2

Portable gas tank

With on/off regulator, ignitor, stand and tubing. Requires charging with LPG from accessory (cigarette lighter) containers.

PE394-33 Portable gas tank

PE394-14 LPG containers, pack of 10

Note: Gas containers PE394-14 can be exported only as seafreight deck cargo. Local purchase is recommended.

Setaramp controller

For automated temperature control. Allows the user to define the heating ramp rate within the limits of the main unit. Overall 335 x 315 x 60mm W x D x H. Weight 3kg. For 220-240V 50/60Hz single phase supplies. Requires probe assembly PE353-17 for operation.

PE353-14 Setaramp controller

PE353-17 Probe assembly, for use with PE353-14

Flash/Fire Points – Cleveland

ASTM D92-IP 36; EN2592; BS2000 Pts. 36 and 403; ISO2592; NF T60-118; FTMS 791b 1103.7; JIS K2265; AASHTO T48.

Semi-Automatic Tester

Cleveland Flash Tester, Open Cup

A semi-automatic electrically heated tester. With button operated, electrically driven sweep arm for test flame application. Stainless steel case. The test flame is fuelled from an LPG cylinder via the accessory gas valve, or it can be connected to a mains gas supply. Overall 310 x 290 x 330mm W x D x H. Weight 6.3kg. For 220-240V 50/60Hz single phase supplies.

PE360-10 Cleveland open, semi automatic

Portable gas tank

With on/off regulator, ignitor, stand and tubing. Requires charging with LPG from accessory (cigarette lighter) containers.

PE394-33 Portable gas tank

PE394-14 LPG containers, pack of 10

Note: Gas containers PE394-14 can be exported only as seafreight deck cargo. Local purchase is recommended.

Setaramp controller

For automated temperature control. Allows the user to define the heating ramp rate within the limits of the main unit. Overall 335 x 315 x 60mm W x D x H. Weight 3kg. For 220-240V 50/60Hz single phase supplies. Requires probe assembly PE353-17 for operation.

PE353-14 Setaramp controller

PE353-17 Probe assembly, for use with PE353-14

Thermometers ASTM11C/IP28C; ASTM11F/IP28F

Fume cupboards – see FZ478/FZ489-series.

Thermometers ASTM/IP – see *Thermometers section*.



PE350-10 with PE353-14 and PE353-17



PE360-10 with PE353-14 and PE353-17

Petroleum

Setaflash Series 3 'Active Cool', Closed Cup, Flash Point Testers

ASTM D3278; ASTM D3828- IP303 Pts. 1 & 2; IP523; IP524; ISO3679; ISO3680; BS6664 PTS. 3 & 4; BS3900 PT. A13; BS-EN456; ASTM E502.

For closed cup testing. Portable, low cost instruments providing rapid test results on the flashpoint of liquids and semi-solids using the Rapid Equilibrium Method, over the range 10°C to 130°C (50 to 260°F). Built-in, electronic, peltier coolers quickly reduce the temperature after a test is completed, allowing sample removal and preparation for further tests and thereby dramatically reducing overall test times and improving throughput. They also allow testing to be conducted at, or below, ambient temperature. User selectable temperature units (°C and °F), a simple-to-use control panel, precise temperature and automatic flash detection enable easy and safe flash point testing even by those with no previous laboratory experience. 'Active Cool' has an integral temperature ramp mode that automatically increases sample temperature at 2°C per minute until a flash is detected. With choice of sample sizes (2ml or 4ml) and adjustable test time from 1 to 99minutes. The test flame is fuelled via a rechargeable gas tank with on/off switch and fine adjustment. Fuelling is by accessory LPG (cigarette lighter) cartridges. With standard aluminium cup or with corrosion resistant stainless steel cup insert, 2ml sample syringe and ignitor. Without gas charge. Overall 280 x 260 x 260mm W x D x H. Weight 5kg. For 100-240V 50/60Hz single phase supplies or 12V d.c. using optional power adapter.

PE375-10 Setaflash 'Active Cool', closed aluminium cup

PE375-25 Setaflash 'Active Cool', with corrosion-resistant, stainless steel cup insert

Accessories

PE394-10 Power adapter for operation from 12V d.c. vehicle systems, with vehicle cigar lighter plug

PE394-14 LPG containers, pack of 10

PE394-19 Carrying case for PE375 testers



PE375

Petroleum

Setaflash Series 3 Flash Point Testers

ASTM D3278; ASTM D3828-IP303; ISO3679; EN456; ISO3680; BS3900 Part A13; UN Class 3 non-viscous flammable liquids.

Setaflash Series 3 Closed Cup Flash Point Tester

For closed cup testing. Portable, low cost instrument providing rapid test results over the range ambient to 300°C (sub-ambient using accessory coolant module). Features digital setting of test parameters, automatic flash detection and digital readout of temperature and time. A 2ml sample is required for flash points up to 100°C and 4ml sample for flash points between 100°C and 300°C. Test time is adjustable from 1 to 99 minutes. The test flame is fuelled via a rechargeable gas tank with on/off switch and fine adjustment. Fuelling is by accessory LPG (cigarette lighter) cartridges. Available fitted with standard aluminium or corrosion resistant stainless steel cup and supplied with 2ml sample syringe and ignitor. Without gas charge. For 115-220V 50/60Hz single phase supplies or 12V d.c. using optional power adapter. Overall 280 x 256 x 256mm W x D x H. Weight 4kg.

PE380-20 Setaflash 3, closed aluminium cup

PE380-27 Setaflash 3, closed stainless steel cup

ASTM D4206; BS3900 Part A11; ISO DIS (TR) 9038; UN Class 3 Test L.3; CFR 49-173-120; IATA DANGEROUS GOODS REGS. SECTION 3.3.5; H.S.C. Carriage of Dangerous Goods by Road & Rail App B.

Setaflash Series 3 Open Cup Flash Point Tester

For open cup testing. Similar construction and specification to PE380-20 but with an aluminium, open cup for flash/no flash, finite determinations or sustained combustion tests. A manually operated sweeping arm is fitted to the cup. The flash or sustained combustion characteristics of the sample are observed visually by passing the test flame over the sample. Supplied with 2ml sample syringe. For 115-220V 50/60Hz single phase supplies or 12V d.c. using optional power adapter. Overall 280 x 256 x 256mm W x D x H. Weight 4kg.

PE390-20 Setaflash 3, open aluminium cup

Accessories for PE380-20, PE380-27 and PE390-20

PE394-10 Power adapter for operation from 12V d.c. vehicle systems, with vehicle cigar lighter plug

PE394-14 LPG containers, pack of 10

PE394-19 Carrying case for PE380-20, PE380-27 and PE390-20

PE394-24 Metal cooling block to reduce block temperature after test

PE394-28 Coolant module for performing sub ambient tests. Requires, but does not include a supply of dry-ice

Note: Gas containers PE394-14 can be exported only as seafreight deck cargo. Local purchase is recommended.

Verification and Certified Reference Materials for flash point testers are available – *details on request.*



PE390, PE380 is similar

Petroleum

Setaflash Series 8 Flash Point Testers

ASTM D7236; ASTM D3728; ASTM E502; IP523; IP524; IP534; ISO3679; ISO3680; BS6664 Pts. 3 and 4, BS3900 Pt. 13, UN Class 3 non-viscous flammable liquids; CHIPS regs; EPA 1020 A & B.

Setaflash Series 8, Closed Cup

Ranges: standard model: ambient to +5°C to 300°C
'Active Cool' mode: +10°C to 130°C (air-cooled), -20 to 110°C (using auxiliary water cooling)

Sample size 2 or 4ml according to method and 1 to 2 minutes test times (European FAME specification test programme can be user defined from 1 to 99 minutes) in Rapid Equilibrium mode, or 7 minutes typically in Ramp mode. Ignition by electronic lighter or gas flame according to user preference. Time, temperature and ramp values are digitally set, controlled and displayed using a colour LCD screen and membrane keys. Shutter operation, flame dipping and flash detection are all automatic. An integral memory function stores up to 64 results with operator and sample preferences and RS232C, USB and ethernet interfaces for connection to the user's PC, LAN or printer are provided. Barometric pressure monitoring is included and results are automatically compensated. Overall 300 x 340 x 380mm H x W x D. Weight 8kg. For 200-240V 50/60Hz single phase supplies (2 x 1.5V AA batteries are required for the internal clock).

PE400-40 Setaflash Series 8, closed cup, ambient +5°C to 300°C

Setaflash Series 8, 'Active Cool', Closed Cup

Generally as PE400-40 but range -20°C to 130°C. Peltier cooling built-in for sub-ambient testing and connections for auxiliary water cooling. Minimum temperature achievable are +10°C with air cooling, or -20°C with auxiliary water cooling. For 200-240V 50/60Hz single phase supplies (2 x 1.5V AA batteries are required for the internal clock).

PE400-60 Setaflash Series 8 'Active Cool', closed cup, -20°C to 130°C

Portable gas tank

With on/off regulator, ignitor, stand and tubing. Requires charging with LPG from accessory (cigarette lighter) containers.

PE394-33 Portable gas tank

PE394-14 LPG containers, pack of 10

BL610-15 Battery for internal clock, 1.5V AA (2 required)

Note: Gas containers PE394-14 can be exported only as seafreight deck cargo. Local purchase is recommended.



PE400-60, PE400-40 is similar

Petroleum

Multiflash Testers, Seta

A fully automated modular system designed for testing the flash point of fuels, lubricating oils, solvents, chemicals, waste materials and many other substances. Comprises a universal base unit that incorporates a backlit, dot matrix LCD readout, control and data acquisition functions with a series of interchangeable test modules which faithfully conform to the requirements of the appropriate test method.

- ◆ Gas or electric ignition
- ◆ Test modules include rechargeable LPG tank
- ◆ Automatic flash detection
- ◆ Auto recognition of test modules by the base unit control which automatically sets up relevant test parameters and calibration data
- ◆ Precise test results
- ◆ Easy operation with menu/graphics interface, two buttons and rotational control switch
- ◆ Integral draught screen maximises result consistency and accuracy
- ◆ RS232 interface allows downloading of key test parameters to an external printer or user's PC
- ◆ Reliable operation with low maintenance

Multiflash testers

As described. Supplied complete with base unit, mains lead, instructions and test module as indicated. Accessory test modules are also available.

Multiflash Pensky-Martens (A and B closed cup)

ASTM D93; IP34; IP404; ASTM E502; BS2000 Parts 34 and 404; ISO2719; EN22719; JIS K2265; NF M07-19; DIN 51758; FTMS 791b 1102; EPA1010.

Range: Ambient to +400°C. Overall (complete) 380 x 470 x 340mm H x W x D. Weight 12kg. For 115V, 230V 50/60Hz single phase supplies, 1000W.

PE420-10 Pensky-Martens, complete tester

PE420-15 Pensky-Martens, module only

Multiflash Abel (Closed cup and Equilibrium)

IP170; ISO13736; EN13736; BS 2000 Part 170; IP304 Parts 1 and 2; IP491; IP492; ISO1516; ISO1523; BS3900 Parts A8 and A9; BS6664 Parts 1 and 2.

Range: Ambient to +93°C (-30°C minimum with accessory cooling). Overall (complete) 470 x 470 x 340mm H x W x D. Weight 13kg. For 115V, 230V 50/60Hz single phase supplies, 600W.

PE420-20 Abel, complete tester

PE420-25 Abel, module only

Multiflash Cleveland (Open cup)

ASTM D92; IP36; ISO2592; EN22592; BS2000 Parts 36 and 403; DIN 51376; T60-118; JIS K2265; AASHTO T48.

Range: Ambient to +400°C. Overall (complete) 350 x 470 x 340mm H x W x D. Weight 11kg. For 115V, 230V 50/60Hz single phase supplies, 600W.

PE420-30 Cleveland, complete tester

PE420-35 Cleveland, module only

Multiflash Tag (Closed cup)

ASTM D56; D3941; D3934; E502; IP304 Parts 1 and 2; IP491; IP492; ISO1516; ISO1523; FTNMS 791b 1101; JIS K2265.

Range: Ambient to +93°C (-18°C minimum with accessory cooling). Overall (complete) 410 x 470 x 340mm H x W x D. Weight 12kg. For 115V, 230V 50/60Hz single phase supplies, 600W.

PE420-40 Tag, complete tester

PE420-45 Tag, module only

Multiflash Small Scale (Setaflash)

ASTM D3278; ASTM3828; IP303 Parts 1 and 2; ISO3679; ISO3680; BS6664 Parts 3 and 4; BS3900 Part A13; BS EN456; ASTM E502; UN Class 3 Non-viscous Flammable Liquids; CHIPS Regulations; Classification of Dangerous Goods for Carriage; Viscous and non-viscous liquids; EPA1020 A and B; IP/ASTM Automatic Small Scale draft method.

Range: Ambient to +300°C (-30°C minimum with accessory cooling). Overall (complete) 370 x 470 x 340mm H x W x D. Weight 11kg. For 115V, 230V 50/60Hz single phase supplies, 600W.

PE420-50 Small scale, complete tester

PE420-55 Small scale, module only

Accessories

PE394-14 LPG containers, pack of 10

Note: Gas containers PE394-14 can be exported only as seafreight deck cargo. Local purchase is recommended.

An accessory mains gas adapter assembly is available, please indicate the gas type to be used and we will provide further information.

Cryostats – see CL120.



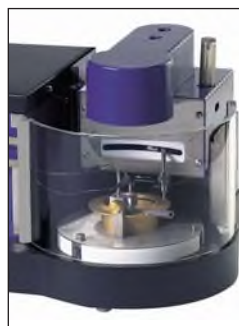
PE420-10 with PE420-82 in use



PE420-25 in use



PE420-45 in use



PE420-35 in use



PE420-55 in use

Petroleum

Penetrometers

ASTM D937 - IP 179; ASTM D1403-IP310; ASTM D5; D217;D1321; D1831; D2884; IP49; IP50; IP376; BS1377; BS2499 Pt. 3; BS2000 Pts. 49, 50 and 179; EN1426; ISO2137; DIN 51579; DIN 51 580; NFT60-119; NFT60-132; NF T60-140; NFT T66-004; JIS K2220.

Universal Automatic Penetrometer

A semi-automatic penetrometer with an electro-magnetic head which provides automatic plunger release and retention. The head is controlled by a solid state module built into the base, providing 5, 8, 10, 12, 30 or 60 second penetrations. Also fitted with a two speed head elevating mechanism engaging in gear cut track for quick and precise tip positioning, aided by a built-in adjustable illuminator. With machined cast aluminium base, inset spirit level, vertical pillar and depth indicator. A slipping clutch on the pointer makes resetting easy. The 150mm diameter dial is graduated in 0 to 400Pen (0 to 40mm x 0.1mm). Supplied with 47.5g plunger and one each 50g and 100g weights. Overall 300 x 330 x 670mm W x D x H. Weight 9kg. For 100-120V and 220-240V 50/60Hz single phase supplies. Without needles or cones.

PE460-25 Universal, automatic

Accessory

Mirror and clamp. To assist positioning of penetration device over the sample surface. To fit penetrometer PE460-25.

PE468-08 Mirror

Universal Manual Penetrometer

Generally as PE460-25 but without the electro-magnetic head and controller module, a manual plunger release is provided instead. Supplied with 47.5g plunger and one each 50g and 100g weights. Overall 300 x 330 x 670mm W x D x H. Weight 7kg. For 100-120V and 220-240V 50/60Hz single phase supplies. Without needles or cones.

PE460-40 Universal, manual

Digital Penetrometer, Setamatic

Measures penetration of substances from light creams to heavy waxes and bitumen. Time setting, control and display are digital from 1 to 9999 seconds and results may be given in millimetres of penetration or in Pen units. Range 0 to 700 Pen (0 to 70mm). An RS232C interface is provided for connecting to the users own computer. Machined cast aluminium base with inset spirit level, illuminator on flexible stem to aid sample viewing, two-speed raising and lowering mechanism for the counterbalanced head and automatic plunger release and retention. Supplied complete with 47.5g standard plunger, 50g and 100g plunger weights. Overall 300 x 330 x 590mm H x W x D. Weight 12.5kg. For 110-120V and 220-240V 50/60Hz single phase supplies. Without needles or cones.

PE485-10 Digital Setamatic

Accessory

Contact sensing plunger. Allows accurate positioning of the penetration tip when testing a wax or bitumen sample immersed in water.

PE485-60 Contact sensing plunger

Accessories

Needles To ASTM D5 - IP 49.

Needles, mass 2.5g. Supplied in a pack of 3.

PE486-08 Needles

Wax penetration needle To ASTM D1321; IP376; DIN 51 579.

Needle, mass 2.5g, supplied singly.

PE486-11 Wax needle

Cones To ASTM D217 - IP 50.

Acetal with hardened steel tip. Mass 102.5g.

PE486-18 Standard cone

Optional cone. Brass with hardened steel tip. Mass 102.5g.

PE486-20 Brass cone

Special full scale cone. Aluminium with hardened steel tip. Mass 29.8g.

PE486-25 Aluminium cone

Sample Containers

To ASTM D5 - IP 49; BS 2000 Part 49.

PE490-15 55 x 35mm, pack of 50

PE490-20 55 x 57mm, pack of 50

PE490-25 70 x 45mm, pack of 50

Calibration Kit

For all penetrometers. With UKAS calibration certificate.

PE492-10 Calibration kit

Seta Grease Worker

ASTM D217 - IP 50, BS 2000 Part 50.

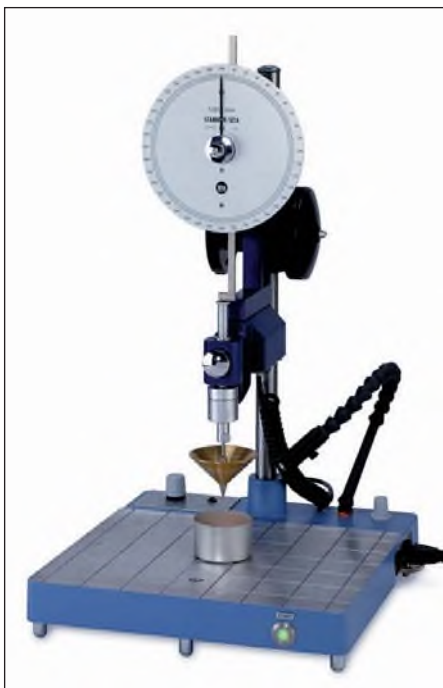
Greaseworkers, manual

For use with stiff greases. With central operating rod, handle, lip-seal, worker pot and large bore stopcock with thermometer hole.

PE495-10 Basic model

Basic model plus slave unit for working heavy greases.

PE495-15 Slave model



PE460-25 with accessories, PE460-40 is similar



PE485-10 with accessories



Petroleum

Vapour Pressure

Vapour Pressure

ASTM D5188; D5191; IP394; EN13016-1; EN13016-2.

Vapour Pressure is important in both automobile and aviation gasolines; affecting start up, warm up, and tendency to vapour lock. It also gives an indirect measure of the potential for hydrocarbon emissions under controlled conditions.

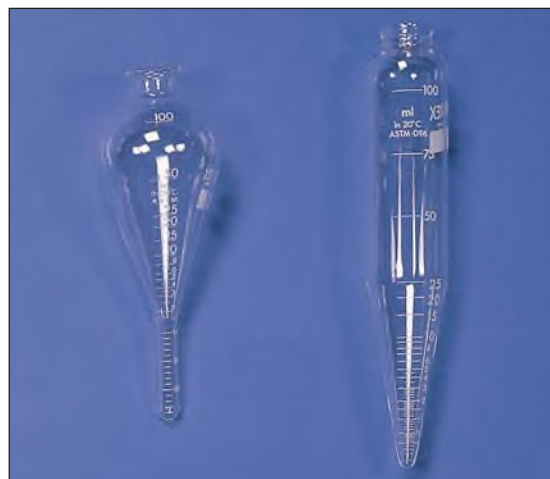
Vapour Pressure Analyser, SetaVap

Test pressure range 0 to 600kPa. Temperature range from 25°C below ambient to +100°C. The operator can select single or multiple tests on a sample at static, ramping or stepped temperatures. Vapour-Liquid Mode enables determination of the temperature which produces a pre-set pressure. Digital setting and display, with electronically controlled cooling and heating. Septum change, sample drain and print-out of temperature/pressure calibration is automatic. Calibration and test prints include time, date and sample identity. Reid correction, RS232C interface and pre-programmed sequences are provided. Overall 450 x 370 x 350mm W x D x H. Weight 23kg. For 110-120V and 220-240V 50/60 Hz single phase supplies.

PE645-10 SetaVap

Spares and Accessories

- PE645-25** Paper/ink pack spare. With 2 x paper rolls and 1 x inker
- PE645-40** Gas tight syringe 1ml
- PE645-43** Gas tight syringe 5ml
- PE645-45** Pressure calibrator



CF380-10

PE814-24



PE645-10

Oil Test Centrifuge

Oil Test Centrifuge, Seta-Hermle

ASTM, D91; D96; D893, D1290; D1796; D1966; D2273; D2709; D2711; D4007; IP75 (Obsolete); IP359; BS2882 (Obsolete); ISO374; ISO9030; DIN 51 793; NF M07-020; FTMS 791b Methods 3000, 3003, 3004, 3101, 3121, 5661; API2542; API2548; API MPMS Chapter 10.3.

With four place swing out rotor/bucket assembly and microprocessor controller with keypad operation and display of speed or rcf, temperature and time. Up to 9 run profiles can be stored within the on-board memory. Ranges settable include speed 0 to 3000 x 10rpm, rcf 0 to 2254 x 10xg, Temperature +30 to +70°C x 1°C and timer 1 to 60 x 1 minute intervals or continuous. There is also a 1 to 99 second "Quick-run" mode. Braking is adjustable from 110 seconds to 30 seconds down to a full stop. Chamber pre-heating and vertical bucket position at rest after the run respectively improve the speed and accuracy of results. Meets BS4402, DIN58970 parts 1, 2 and 4 and UVV VBG7z requirements. Overall dimensions 610 x 730 x 445mm W x D x H. Weight 86kg. For 230V 50/60Hz single phase supplies.

PE810-30 Oil centrifuge

Accessories

Adapters. Supplied in a packs of 4.

- PE814-14** For 100ml 8" conical shaped tubes
- PE814-16** For 100ml 8" pear shaped tubes
- PE814-18** For 100ml 6" conical shaped tubes
- CF380-10** 100ml 6" pear shaped tube
- CF380-14** 100ml 8" conical shaped tube
- PE814-24** 100ml 6" conical shaped tubes, pack of 6
- PE814-40** Transformer for operating PE810-30 on 120V 60Hz supplies
- PE814-64** Trolley for PE810-30, 235mm high with lockable castors
- PE814-68** Trolley for PE810-30, 545mm high with lockable castors

Water Estimation

Dean and Stark Method

- ◆ Receivers to BS756, Boiling flasks and Condensers – see *Quickfit* section.
- ◆ Heating mantles – see *Heating* section.

Viscometry

- ◆ Glass Kinematic Viscometers ASTM D445-IP71 – see *Viscometer* section.
- ◆ Flow Cups – see *Viscometer* section.



PE810-30

Petroleum

Oil Test Centrifuges



ASTM D91; D96 (obs.); D8932; D1290; D1796; D2273; D2709; D4007; IP75, IP539 (both obs.)

Robust, versatile centrifuges developed for use in industrial and petrochemical research laboratories.

- ◆ Choice of ambient or heated models
- ◆ Speed or rcf display available
- ◆ Rotary lid latch is easy to open
- ◆ 10 programme memory
- ◆ Easy-to-use control panel with membrane keypad and rotary dial setting
- ◆ Non-volatile memory of last run protocol

| Model | | Rotofix 46 | Rotofix 46H |
|---------------------|-----|--|--------------------|
| Maximum speed, | rpm | 4000 | 4000 |
| Maximum rcf, | xg | 3095 | 984 |
| Temperature range | °C | - | ambient + 20 to 90 |
| Timer | | 1 second to 99 minutes 59 seconds, with continuous run and "Pulse" key - both models | |
| Data storage | | 10 programmes - both models | |
| Supply requirements | | 200-240V 50/60Hz single phase - both models | |
| Overall W x D x H | mm | 538 x 647x 345 - both models | |
| Weight | kg | 60 - both models | |

As described. For 200-240V 50/60Hz single phase supplies. Without rotor, buckets, adapters or tubes, which are required for operation.

PE805-20 Rotofix 46, unheated, without rotor

PE805-40 Rotofix 46H, heated, without rotor

Accessories

CD728-67 Swing-out rotor, 4-place, for ASTM tubes, maximum rpm/rcf 2000/984xg

CD729-45 ASTM D96 bucket, for CD728-67

CD729-46 1 x adapter (holds CF380-10) for bucket CD729-45. Maximum rcf 984xg)

CD729-47 1 x adapter (holds CF380-14) for bucket CD729-45. Maximum rcf 961xg)

CD729-48 1 x adapter (holds CF380-16) for bucket CD729-45. Maximum rcf 961xg)

CF380-10 100ml 6" pear shaped tube

CF380-14 100ml 8" conical shaped tube

CF380-16 100ml 6" conical shaped tube



PE805 in use with accessories

Soil Testing

Soil Testing Apparatus

Field Soil Test Kit, pH/N/P/K, Hanna

Comprising test solutions and equipment to perform simple tests to determine nitrogen, phosphorus, potash and pH of soils. Sufficient for approximately 25 tests. Supplied with instructions and recommendations for optimum soil conditions to maximise plant growth.

SG500-30 HI-3896 Soil test kit

SG500-34 Spare reagent pack for N/P/K analysis only

Soil Hydrometer

For quantitative determination of particle size distribution in soils according to ASTM D422. Range -5 to +60g/litre, subdivision 1g/litre. Adjusted for use at 20°C. Length 280mm.

SG640-15 Soil hydrometer, ASTM D422

Soil Hydrometer

For determination of size distribution in soils according to BS1377. Range 0.995 to 1.030g/ml, subdivision 1g/ml. Adjusted for use at 20°C. Length 345mm.

SG640-25 Soil hydrometer, BS1377

Thermometer

A spirit in glass thermometer, range 0 to 110°C mounted in an aluminium tube 225mm long with probe end for inserting into soil or compost and a cut-out front for reading the temperature. The top of the tube is marked with a large red sphere for ease of identification in the field.

SG680-10 Insert thermometer

Sample Bags

Sample, reseal

Polyethylene. With rim-channel closure, which can be opened and resealed repeatedly. Supplied in bags of 100.

| | Size mm |
|---------------------------|-----------|
| Plain | |
| BA100-19 | 80 x 120 |
| BA100-33 | 100 x 150 |
| BA100-39 | 120 x 170 |
| BA100-51 | 200 x 300 |
| BA100-56 | 300 x 400 |
| With writing panel | |
| BA102-16 | 70 x 100 |
| BA102-33 | 100 x 150 |
| BA102-39 | 120 x 170 |
| BA102-51 | 200 x 300 |

Other equipment suitable for use in soil testing will be found under the following section headings: *Mills – Mixers – Moisture – Sampling – Sieves.*

Hydrometer jars – see *HT400/HT412.*

Sample containers – see *SX310, TW225/TW244.*



SG500-30



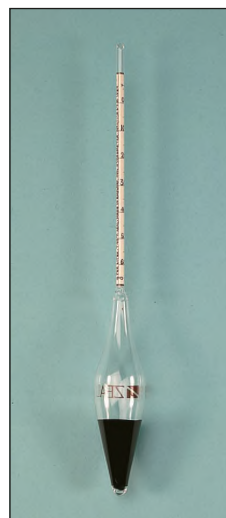
BA100



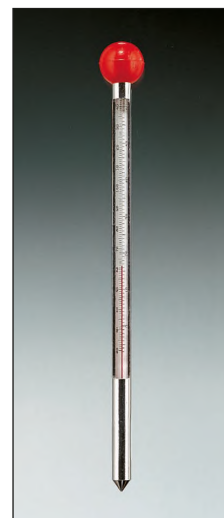
BA102



SG500-34



SG640



SG680

Viscosity

Flow Cups

Simple to use flow cups for the approximate measurement of apparent viscosity in a wide range of materials including paints, varnishes, lacquers, inks and other viscous products.

BS-ISO Flow Cups

To BS3900 part A6 : 1996; ASTM D5125; EN - ISO2431; DIN 53224. Aluminium alloy with stainless steel jet. The cup number is the orifice diameter in mm.

VC100-15 No. 3
VC100-20 No. 4
VC100-25 No. 5

VC100-30 No. 6
VC100-40 No. 8*

*Note: This cup is not in the current BS-ISO series but is offered for use with high viscosity samples.

B-Type Flow Cups

Aluminium alloy. As specified in former BS3900 Section A6: 1971. Viscosity range stated is approximate.

| | Jet | Orifice diameter inches | Viscosity range stokes |
|-----------------|-----|-------------------------|------------------------|
| VC120-10 | B2 | 0.093 | 0 to 0.5 |
| VC120-15 | B3 | 0.125 | 0.4 to 1.2 |
| VC120-20 | B4 | 0.156 | 0.8 to 2.5 |
| VC120-25 | B5 | 0.187 | 1.5 to 10 |
| VC120-30 | B6 | 0.281 | 10 to 50 |

Accessory stand for Flow Cups

VC148-18 Stand, with levelling feet and built-in spirit level

Zahn Flow Cups

Stainless steel with 300mm looped handle with ring which allows cup to be held vertically. Cup capacity 44ml. To ASTM D816 and ASTM D1084.

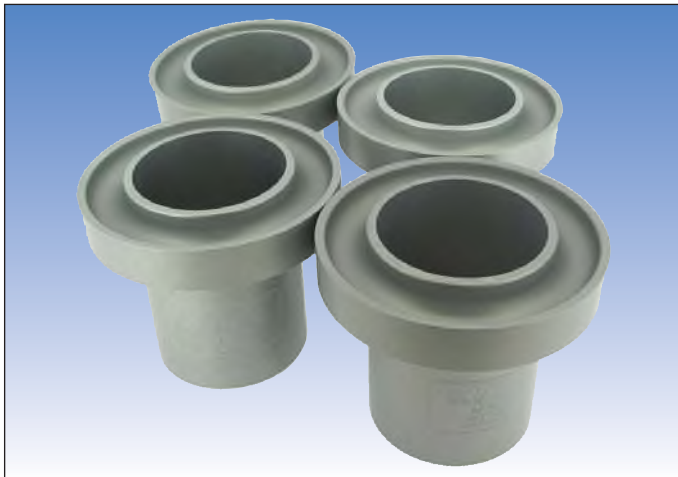
| | No. | Orifice diameter inches | Viscosity range centipoise |
|-----------------|-----|-------------------------|----------------------------|
| VC170-10 | 1 | 0.078 | 20 to 85 |
| VC170-20 | 2 | 0.108 | 30 to 170 |
| VC170-30 | 3 | 0.148 | 170 to 550 |
| VC170-40 | 4 | 0.168 | 200 to 900 |
| VC170-50 | 5 | 0.208 | 250 to 1200 |

Stopwatches – see *Timers* section.

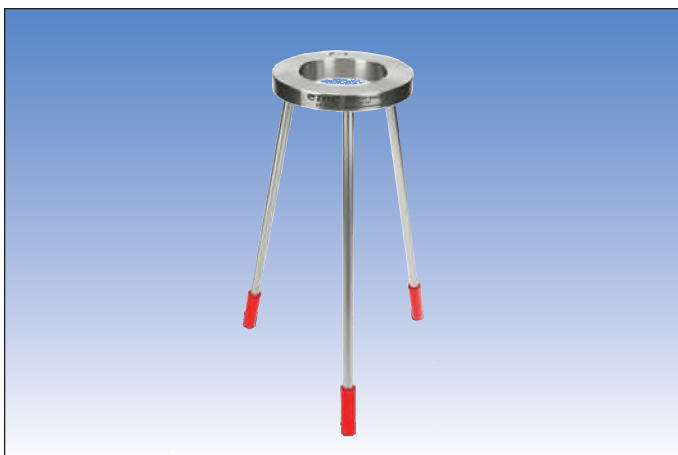
ASTM/IP Thermometers – see *Thermometers* section.

Note

To convert readings in centistokes (cSt) into centipoise (cP) the value should be multiplied by the sample liquid's specific gravity.



VC100



VC148-18



VC170

Viscosity

Calibrated, Glass Capillary, Kinematic Viscometers

To ASTM D445-IP71, BS188, ASTM D446; 51 562, BS2000 Part 71, ISO3104, ISO3105.

- ◆ All viscometers are supplied calibrated in accordance with ASTM D445-IP71, BS188 and ISO3105 and are supplied with a UKAS-traceable certificate
- ◆ Calibration certificate supplied includes the calculated constant (C)
- ◆ All viscometers can be used with transparent liquids and in addition the reverse flow models VC534 series can be used with opaque liquids

| | Size | Nominal constant | Viscosity range cSt. |
|------------------------------------|------|------------------|----------------------|
| U-Tube, calibrated | | | |
| VC504-10 | O | 0.001 | 0.3 to 1 |
| VC504-15 | A | 0.003 | 0.9 to 3 |
| VC504-20 | B | 0.01 | 2.0 to 10 |
| VC504-25 | C | 0.03 | 6 to 30 |
| VC504-30 | D | 0.1 | 20 to 100 |
| VC504-35 | E | 0.3 | 60 to 300 |
| VC504-40 | F | 1.0 | 200 to 1,000 |
| VC504-45 | G | 3.0 | 600 to 3,000 |
| VC504-50 | H | 10.0 | 2,000 to 10,000 |
| Suspended level, calibrated | | | |
| VC519-10 | 1 | 0.01 | 3.5 to 10 |
| VC519-15 | 1A | 0.03 | 6 to 30 |
| VC519-20 | 2 | 0.1 | 20 to 100 |
| VC519-25 | 2A | 0.3 | 60 to 300 |
| VC519-30 | 3 | 1.0 | 200 to 1,000 |
| VC519-35 | 3A | 3.0 | 600 to 3,000 |
| VC519-40 | 4 | 10.0 | 2,000 to 10,000 |
| VC519-45 | 4A | 30.0 | 6,000 to 30,000 |
| VC519-50 | 5 | 100.0 | 20,000 to 100,000 |

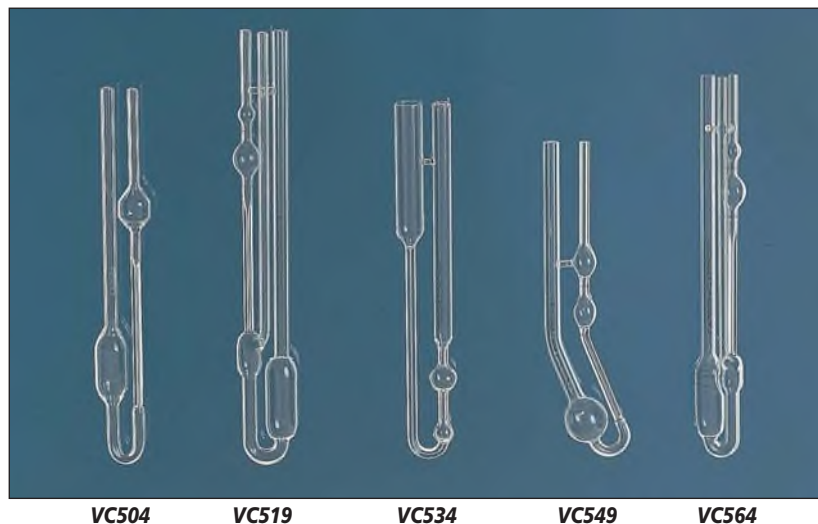
Dimensions and sample size The approximate length of the viscometer and sample size required by the viscometers is:

| | Sample ml | Length mm |
|-----------------|-----------|-----------|
| U-tube | 13 to 40 | 300 |
| Suspended level | 22 to 40 | 330 |
| Reverse flow | 12 to 25 | 275 |
| Cannon Fenske | 7 | 250 |
| Ubbelohde | 18 | 283 |

Standard Reference Oils

Calibrated to UKAS requirements at either 25 or 40°C are available. Details on request. Please specify your requirements.

| | Size | Nominal constant | Viscosity range cSt. |
|--|------|------------------|----------------------|
| Reverse flow, calibrated | | | |
| VC534-10 | 1 | 0.003 | 0.6 to 3 |
| VC534-15 | 2 | 0.01 | 2 to 10 |
| VC534-20 | 3 | 0.03 | 6 to 30 |
| VC534-25 | 4 | 0.1 | 20 to 100 |
| VC534-30 | 5 | 0.3 | 60 to 300 |
| VC534-35 | 6 | 1.0 | 200 to 1,000 |
| VC534-40 | 7 | 3.0 | 600 to 3,000 |
| VC534-45 | 8 | 10.0 | 2,000 to 10,000 |
| VC534-50 | 9 | 30.0 | 6,000 to 30,000 |
| VC534-55 | 10 | 100.0 | 20,000 to 100,000 |
| VC534-60 | 11 | 300.0 | 60,000 to 300,000 |
| Cannon-Fenske Routine, calibrated | | | |
| VC549-10 | 25 | 0.002 | 0.4 to 2 |
| VC549-15 | 50 | 0.004 | 0.8 to 4 |
| VC549-20 | 75 | 0.008 | 1.6 to 8 |
| VC549-25 | 100 | 0.015 | 3 to 15 |
| VC549-30 | 150 | 0.035 | 7 to 35 |
| VC549-35 | 200 | 0.1 | 20 to 100 |
| VC549-40 | 300 | 0.25 | 50 to 250 |
| VC549-45 | 350 | 0.5 | 100 to 500 |
| VC549-50 | 400 | 1.2 | 240 to 1,200 |
| VC549-55 | 450 | 2.5 | 500 to 2,500 |
| VC549-60 | 500 | 8.0 | 1,600 to 8,000 |
| VC549-65 | 600 | 20.0 | 4,000 to 20,000 |
| Ubbelohde, calibrated | | | |
| VC564-10 | 0 | 0.001 | 0.3 to 1 |
| VC564-15 | 0C | 0.003 | 0.6 to 3 |
| VC564-20 | 0B | 0.005 | 1 to 5 |
| VC564-25 | 1 | 0.01 | 2 to 10 |
| VC564-30 | 1C | 0.03 | 6 to 30 |
| VC564-35 | 1B | 0.05 | 10 to 50 |
| VC564-40 | 2 | 0.1 | 20 to 100 |
| VC564-45 | 2C | 0.3 | 60 to 300 |
| VC564-50 | 2B | 0.5 | 100 to 500 |
| VC564-55 | 3 | 1.0 | 200 to 1,000 |
| VC564-60 | 3C | 3.0 | 600 to 3,000 |
| VC564-65 | 3B | 5.0 | 1,000 to 5,000 |
| VC564-70 | 4 | 10.0 | 2,000 to 10,000 |
| VC564-75 | 4C | 30.0 | 6,000 to 30,000 |
| VC564-80 | 4B | 50.0 | 10,000 to 50,000 |
| VC564-85 | 5 | 100.0 | 20,000 to 100,000 |



VC504

VC519

VC534

VC549

VC564

Viscosity

Viscosity Bath, TCB-7

PSL Rheotek

For the determination of kinematic viscosity using capillary viscometers under ASTM D445; IP71; ISO3104; ISO3105; ASTM D1298.

Accommodates up to seven standard viscometer tubes using accessory holders. Digital temperature control and setting to 0.01°C readability with readout and separate thermometer holder. A built-in cooling coil allows cooling to near and sub-ambient temperatures using mains water or an accessory chiller circulator. Corrosion-resistant, stainless steel tank with toughened glass windows in the front and rear panels for ease of viewing (an accessory backlighting unit is available).

| | | |
|---------------------|----|---------------------------|
| Capacity | | 40 litres |
| Range | °C | Ambient to +150 |
| Stability (typical) | °C | ± 0.01 |
| Overall L x W x H | mm | 405 x 380 x 420 |
| Weight, empty | kg | 36 |
| Supply requirement | | 230V 50/60Hz single phase |

Viscometer Bath, TCB-7

As described. With top plate, covers for unused holes in top plate and instruction manual. For 230V 50/60Hz single phase supplies.

VC825-20 TCB-7

Accessories

VC827-05 Universal viscometer holder

Bath Filling Oil

Clear silicone oil formulated for long-term use at the operating temperatures as indicated. Supplied in containers of 5 litres.

VC827-10 25°C to 100°C

VC827-14 100°C to 150°C

VC827-40 Viscometer bench stand

VC827-45 LED backlighting unit for VC825-20, 230V 50/60Hz a.c.

Refrigerated circulators - see *CL120/CL125*

Filling Liquids

It is recommended that before any additive or inhibitor is mixed with your bath liquid, or any proprietary fluid is used in place of mains tap water, the tank content should be checked regularly and if necessary buffered to pH7. Acidic liquids, over very long periods of time can cause damage to the bath due to electrolysis.



VC825-20

Viscosity

Torsional Viscometer

A simple to use comparative viscometer for quality control applications, particularly suited for use in the ceramics industry but can be used with other viscous materials with viscosities up to approximately 10,000cp.

- ◆ Simple manual operation - no electrical connections required
- ◆ Results can be obtained in minutes
- ◆ Can be located on the factory or workshop floor

The instrument comprises a torsion wire attached to a flywheel, suspended above an engraved 360°C scale and a bob for immersing in the sample. Applying a torsion allows the fly-wheel to overswing. This is a measure of the sample viscosity. Results obtained are usually expressed in overswing degrees.

Torsional Viscometer

As described. Overall 150 x 240 x 730mm high. With flywheel, engraved scale and stand. Supplied with one each 30swg wire, $1\frac{1}{16}$ inch bob, sample cup and instructions.

VC830-10 Torsional viscometer

Accessories and Spares

VC832-08 Wire, 30swg

VC832-12 Wire, 36swg

VC832-20 Bob, $\frac{1}{4}$ inch

VC832-23 Bob, $\frac{1}{2}$ inch

VC832-26 Bob, $1\frac{1}{16}$ inch

VC832-29 Bob, $1\frac{1}{8}$ inches

VC832-32 Bob, $1\frac{5}{8}$ inches

VC832-50 Sample cup,
69 x 62mm
diameter x height

VC832-53 Stirrer to provide
manual stirring

Consistometer

A simple, low cost, easy-to-use device for accurately checking laboratory or production samples against consistency, viscosity or flow rate standards. Widely used in the chemical, paint, cosmetic and food processing industries.

- ◆ Robust, stainless steel construction allows easy cleaning after test
- ◆ Low sample requirement (75ml)
- ◆ Engraved graduations every 0.5cm give accuracy and ensure long operational life
- ◆ Supplied with built-in spirit level and adjustment screws

Consistometer

As described. Supplied with spirit level and levelling screws. Overall 355 x 88 x 104mm L x W x H.

VC845-10 Consistometer

Circulators – see *CL120/CL125*.

Stopwatches – see *TM480*.



VC830



VC845

Water Testing

Sediment Determination

Imhoff Cone

For determining the amount of sediment in sewage. Transparent and tough styrene acrylonitrile with moulded graduations.

Graduation intervals:

| | |
|--------|---------------|
| 0.1ml | up to 2ml |
| 0.5ml | 2 to 10ml |
| 1.0ml | 10 to 40ml |
| 2.0ml | 40 to 100ml |
| 50.0ml | 100 to 1000ml |

The lower end of the cone is stoppered to allow for removal of sample and cleaning.

WR150-10 Imhoff cone

Stand

Acrylic for mounting Imhoff cone. Rectangular and holds 2 cones in line, with locating recess on the base plate.

WR160-18 Stand, 2-hole

Settleometer Kit, Nasco

For the evaluation of sludge quality and settlement. Comprises a 1.4 litre acrylic measuring cylinder, dual scale graduated in % and settled sludge volume (SSV) and supplied with a mixing paddle, snap-on lid and instructions. Overall H x diameter 216 x 114mm. Weight 0.6kg.

WR170-05 Settleometer kit

Flocculators



For flocculation tests on water and sewage.

- ◆ 2-bank or 6-bank models available
- ◆ Digital speed indication
- ◆ Include two adjustable speed presets
- ◆ Electronic feedback control achieves precise and reproducible speeds
- ◆ Diffused base illumination with black background
- ◆ Accepts beakers up to 1000ml

Flocculators, Stuart

As described. Variable speed 25 to 250 rpm. Overall 320 x 210 x 500mm W x D x H (2-bank model), 750 x 210 x 460mm W x D x H (6-bank model). For 230V 50Hz single phase supplies. Supplied with rotor blades but without sample beakers.

WR230-05 Flocculator, 2-bank

WR230-20 Flocculator, 6-bank

Accessories

BN120-60 Sample beaker, 1000ml. Borosilicate glass

Coagulant injector for WR230-20 only. Allows simultaneous addition of coagulant or reagent into the six sample beakers.

WR230-50 Coagulant injector

Secchi Disk

Water depth and clarity measurement disk, diameter 200mm, with black/white quadrants. Weighted, with 14 metre cord.

WR239-25 Secchi Disk

BOD Testing

BOD Bottles

BS900-42 250ml

BS900-50 500ml

For full details – see *main page*.

BOD Incubators

With temperature ranges from 0 to +60°C and sizes from 53 to 416 litres capacity – see *IN505/IN685 in the Incubators section*.

Disposable filter units – see *FD250*.

continued on next page



WR150



WR160-18 in use



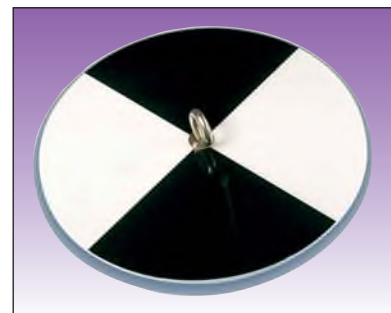
WR170-05



WR230-05



WR230-20



WR239



BS900

Water Testing

BOD System, BD600

Lovibond®

A 6-sample, mercury-free, precision BOD measurement system based on the manometric principle.

- ◆ Direct display of BOD values ranging from 0 to 4000mg/l
- ◆ User-selectable measuring period from 1 to 28 days
- ◆ Applications: BOD₅, BOD₇, OECD 301F
- ◆ Large, graphical display, USB and SD card ports and optional Bluetooth® wireless output using accessory dongle
- ◆ Non-wearing, inductive, magnetic stirring system for the sample vessels
- ◆ User-selectable, automatic start function when used in an incubator, readings commence when sample temperature matches the cabinet internal temperature

| | | |
|--------------------|---------------------|---|
| Ranges | mg/l O ₂ | 0 to 40, 0 to 80, 0 to 200, 0 to 400, 0 to 800, 0 to 2000, 0 to 4000 |
| Measurement period | | 1 to 28 days |
| Result memory | | up to 28 results, depending on measurement period selected |
| Sampling interval | hours | 1 (1 day measurement period) 2 (2 day measurement period) 24 (3 to 28 day measurement period) |
| Power | | 3 x 1.5V type C batteries - sensor 110-240V 50/60Hz - stirrer system |
| Overall, W x D x H | mm | 181 x 375 x 230 |
| Weight | kg | 5.8 |

Supplied with 6 sensor heads, control unit with 3 x 1.5V batteries, inductive stirring unit with a.c. adapter for 110-240V 50/60Hz single phase supplies, 6 sample bottles with seals and stirring bars, 1 each 157ml and 428ml overflow measures (0 to 400mg/l and 0 to 40mg/l BOD ranges), one each bottles of potassium hydroxide (CO₂ absorbent) and nitrification inhibitor solutions, and instructions.

WR245-20 BD600, 6-sample

Spares and accessories

- WR247-05** Spare BOD sample bottle
- WR247-15** Accessory Bluetooth® dongle for wireless download of results
- BL610-20** Spare 1.5V battery (3 required)

Overflow Measures

| | Volume, ml | BOD range, mg/litre O ₂ |
|-----------------|------------|------------------------------------|
| WR247-20 | 428 | 0 to 40 |
| WR247-22 | 360 | 0 to 80 |
| WR247-24 | 244 | 0 to 200 |
| WR247-26 | 157 | 0 to 400 |
| WR247-28 | 94 | 0 to 800 |
| WR247-31 | 56 | 0 to 2000 |
| WR247-33 | 21.7 | 0 to 4000 |



WR245

Samplers



TeleScoop Sample Dippers

Modular system featuring telescopic sampling rods in corrugated aluminium for lightness with rigidity, with snap-on fitment at the end for attaching accessory PP angular or pendulum beakers in a choice of volumes. Angular beakers can be adjusted to a wide variety of positions and pendulum beakers swing to an upright position.

- SD065-10** Sampling rod, 0.65 to 1.2 metres
- SD065-20** Sampling rod, 0.95 to 2.8 metres
- SD065-25** Sampling rod, 1.15 to 3.0 metres
- SD065-30** Sampling rod, 1.25 to 2.5 metres
- SD065-40** Sampling rod, 1.65 to 4.5 metres
- SD065-50** Sampling rod, 1.74 to 6 metres
- SD065-53** Angular beaker, PP, 600ml
- SD065-56** Angular beaker, PP, 1000ml
- SD065-59** Angular beaker, PP, 2000ml
- SD065-72** Pendulum beaker, PP, 600ml
- SD065-75** Pendulum beaker, PP, 1000ml
- SD065-78** Pendulum beaker, PP, 2000ml
- SD065-79** Pendulum beaker, stainless steel, 1000ml
- SD065-84** Bottle holder for bottles up to 750ml*
- SD065-87** Metal cup, 1000ml
- SD065-90** Surface net, PVC/PA, 310 x 280mm L x W
2.5 to 5mm mesh
- SD065-95** Depth net, PP/PA, 190 x 430 x 250mm L x W x D
2.5 to 5mm mesh

*Bottles - see BR767 series.

Full details of these products can be found in the Samplers section.



SD065-53 to SD065-59



SD065-72 to SD065-78



SD065-10 to SD065-50

Water Testing

Water Sample Bottles



Clear PET, with choice of 350ml, 500ml or 1000ml capacities and stable, square or space-saving, rectangular profile. With leakproof, 'double cap' with tamper-evident seal and colour-coded blue (dosed with 120mg/l sodium thiosulphate) or white (undosed). Both versions are labelled with batch details and expiry date. Sterilised by gamma irradiation. Supplied in packs as indicated.

| | Ref. | Capacity ml | Dosed? | Cap | Pack qty. |
|--------------------|------------|-------------|--------|-------|-----------|
| Rectangular | | | | | |
| WR284-02 | WSC350 | 350 | ✓ | Blue | 144 |
| WR284-04 | WSC350/NT | 350 | — | White | 144 |
| WR284-06 | WSC500T | 500 | ✓ | Blue | 144 |
| WR284-08 | WSC500T/NT | 500 | — | White | 144 |
| Square | | | | | |
| WR284-32 | WSC500 | 500 | ✓ | Blue | 108 |
| WR284-34 | WSC500/NT | 500 | — | White | 108 |
| WR284-36 | WSC1000 | 1000 | ✓ | Blue | 70 |
| WR284-38 | WSC1000/NT | 1000 | — | White | 70 |

Water Sampling Bottles

Sterile, rectangular, polypropylene bottles in a range of sizes with offset neck for easy dispensing, tamper-evident caps and attached label. Supplied dosed with Sodium Thiosulphate or undosed and in packs as indicated.

| | Capacity ml | Dosed? | Cap | Pack qty. |
|-----------------|-------------|--------|-------|-----------|
| WR286-10 | 250 | ✓ | Blue | 140 |
| WR286-14 | 250 | — | Green | 140 |
| WR286-20 | 500 | ✓ | Blue | 84 |
| WR286-24 | 500 | — | Green | 84 |
| WR286-30 | 1000 | ✓ | Blue | 56 |
| WR286-34 | 1000 | — | Green | 56 |



WR284



WR286

Thio-Bags®



Whirl-Pak® sample bags suitable for water sampling. Available in either non self-standing or self-standing versions. Ready dosed with sodium thiosulphate to neutralise chlorine in the sample (100ml capacity bags contain 10mg and 300ml capacity bags 30mg of active sodium thiosulphate). Supplied in packs of 100.

Non Self-standing

WR290-02 Thio-Bags®, 100ml

WR290-11 Thio-Bags®, 300ml

Self-standing

WR290-07 Thio-Bags®, 100ml

WR290-12 Thio-Bags®, 300ml

Racks for Thio-Bags®

Dimensions shown are number of apertures x dimensions of apertures.

BA110-10 21 x (40 x 50mm), for WR290-02/-07

BA110-20 18 x (50 x 50mm), for WR290-02/-07

BA110-30 20 x (64 x 64mm), for WR290-11/-12



WR290-02, -11 is similar



WR290-07, -12 is similar



BA110-10 in use



BA110-30 in use

Water Testing

Multiparameter Meters, SevenGo Duo Pro™

METTLER TOLEDO

Portable, robust, dual-channel meters with high functionality and accuracy.

- ◆ Choice of models:
 - SG68: pH, mV, relative mV, ion concentration, dissolved oxygen
 - SG78: pH, mV, relative mV, conductivity
- ◆ Twin-line, alphanumeric display of separate channel parameters and temperature
- ◆ Intelligent sensor management (ISM) stores information in a data chip on-board the probe, including calibrations (factory, current and up to last five historical), probe I.D. and measurement temperature for recall by the meter
- ◆ IP67 protected housing, with or without probes attached
- ◆ Data storage for 500 GLP date records with infra-red communication port
- ◆ 5-point pH calibration with a choice of 7 pre-defined and one user-defined buffer sets, manual or automatic temperature control
- ◆ High or low limit value display alarms with with audible signal selectable
- ◆ Separate PIN protection functions for key settings and data deletion
- ◆ Large, backlit LCD readout with user prompts and choice of 10 languages, probe condition indicator and user I.D.

| Model | | SG68 | SG78 |
|-------------------------------|--|---|--------------------------------------|
| Ranges x resolution, accuracy | pH | -2.00 to 19.999 x 0.001, ±0.002 — both models | |
| | mV (rel. mV) | -1999.9 to +1999.9 x 0.1, ±0.1 — both models | |
| | ions (units) | 0 to 999.9%, ±0.5% | — |
| | mg/l, mmd/l | 9 to +9999ppm | — |
| | mol/l | 1.00E ⁻⁹ to 9.9E ⁺⁹ | — |
| | Oxygen (mg/l, ppm), % | 0.00 to 99.00 x 0.01, ±0.5 (max.) | — |
| | Oxygen saturation, % | 0.0 to 600.0 x 0.1 to 1, ±0.5 | — |
| | Barometric pressure, mbar | 500 to 11000 x 1, ±1 | — |
| | Conductivity | — | 0.01µS to 1000mS x 0.1, ±0.5% |
| | TDS | — | 0.1mg/l to 600g/l x 0.01 to 1, ±0.5% |
| | Salinity, ppt | — | 0.00 to 80.00 |
| | Specific resistance MΩcm ⁻¹ | — | 0.00 to 100.00 |
| | Temperature (ATC) °C | -5 to +105.00 x 0.1, ±0.2 — both models | |
| | (MTC) °C | -30 to +130.00 x 0.1, ±0.2 — both models | |
| Power supply | | 4 x 1.5V AA batteries — both models | |
| Overall, H x W x D | mm | 220 x 90 x 45 — both models | |
| Weight | g | 368 — both models | |



WR655

As described. Supplied as a kit with IP67 probes, wrist strap, instructions, test certificate, declaration of conformity and batteries. Alternatively available as a field kit additionally offering a choice of cable length and containing a field case, rubber meter protection holster, probe clips, 2 x pH4.00 and pH7.00 buffer sachets, calibration bottles (and 2 x 1413µS/cm and 12.88mS/cm sachets - SG78 only).

- WR655-10** SG68-ELK, standard kit, 1.8m cables
- WR655-20** SG68-FK2, field kit, 1.8m cables
- WR655-30** SG68-FK5, field kit, 5m cables
- WR655-40** SG78-ELK, standard kit, 1.8m cables
- WR655-50** SG78-FK2, field kit, 1.8m cables
- WR655-60** SG78-FK5, field kit, 5m cables

Accessories and spares

- WR658-05** Inlab ExpertPro-ISM pH electrode with 1.8m cable
 - WR658-09** Inlab ExpertPro-ISM pH electrode with 5m* cable
 - WR658-11** Inlab 738-ISM conductivity probe with 1.8m cable
 - WR658-14** Inlab 738-ISM conductivity probe with 5m* cable
 - WR658-17** Inlab 605-ISM DO₂ sensor probe with 1.8m cable
 - WR658-21** Inlab 605-ISM DO₂ sensor probe with 5m* cable
 - WR658-23** Membrane kit for DO₂ probes, with 25ml electrolyte and 3 membranes
 - WR658-26** DO₂ electrolyte, 25ml
 - WR658-35** Infra-red download cable with USB adapter (requires WR658-39)
 - WR658-39** LabX® -data transfer software for use with the users' Windows™ OS computer
 - BL610-15** Spare battery, 1.5V (4 required)
- *10m length cable versions are available - details on request.

Water testing

Multiparameter Meter, HI98194

HANNA

A portable, ruggedly constructed, multichannel meter and probe system.

- ◆ Provides measurement of conductivity, TDS, resistivity, salinity and seawater units, dissolved oxygen, pH/ORP, atmospheric pressure and temperature
- ◆ IP67-rated meter and IP68-rated probe suitable for depths up to 20 metres and temperatures between -5 and +55°C
- ◆ Auto-sensing of sensors within the probe
- ◆ Automatic logging with storage of up to 45000 samples
- ◆ GLP features include calibration time-out notification, calibration memory of five previous calibrations and reading validation
- ◆ High resolution, backlit dot matrix display
- ◆ Intuitive keypad with hard and virtual soft keys and multilingual menu prompts
- ◆ Easy sensor replacement
- ◆ Approximately 200 hours battery life

| | | |
|--------------------------------------|---|---|
| Model | HI98194 | |
| Ranges x resolution, accuracy | pH | 0.00 to 14.00 x 0.01, ±0.02 |
| | mV (rel. mV) | -600.0 to +600.0 x 0.1, ±0.5 |
| | ORP (mV) | -2000.0 to +2000.0 x 0.1, ±1.0 |
| | Oxygen % | 0.0 to 500.0 x 0.1, (up to 300.0%: ±1.5% of reading or ±1%, whichever is greater, ±3% of reading; rest of range) |
| | ppm (mg/l) | 0.00 to 50.00 x 0.01, (up to 30.0ppm: ±1.5% of reading or ±0.1ppm, whichever is greater, ±3% of reading; rest of range) |
| | Barometric pressure mm Hg | 450 to 850 x 0.1, ±3mm Hg within ±15°C from the temperature during calibration |
| | mbar | 600.0 to 1133.2 x 0.1, ±3mbar within ±15°C from the temperature during calibration |
| | Conductivity EC | 0.1µS to 400mS x 0.1 (manual or autoranging), ±1% of reading or ±1µS, whichever is greater |
| | TDS | 1mg/l to 400g/l x 0.1 (manual or autoranging), ±1% of reading or ±1mg/l, whichever is greater |
| | Salinity PSU | 0.00 to 70.00 x 0.01, ±2% of reading or ±0.01PSU, whichever is greater |
| | Seawater σ | 0.0 to 50.0 σ _t , σ ₀ , σ ₁₅ |
| | Specific resistance MΩcm⁻¹ | 0 to 1.0000 x 0.0001 (autoranging: Ωcm ⁻¹ , kΩcm ⁻¹ , MΩcm ⁻¹) |
| | Temperature (and ATC) °C (K) | -5.00 to +55.00 x 0.01, ±0.15 |
| | °F | 23.00 to +131.00 x 0.01, ±0.27 |
| Logging | 45,000 records with one second to three hour intervals selectable | |
| Output | Opto-isolated micro USB port | |
| Power supply | 4 x 1.5V AA batteries | |
| Overall, H x W x D | mm | 185 x 93 x 36 |
| Weight | g | 400 |

Multiparameter meter, HI98194, Hanna

As described. Supplied with ABS and stainless steel probe housing containing replaceable pH, conductivity and dissolved oxygen sensors with reinforced, 4 metre cable*, micro USB cable and downloading/data handling software for use on the user's computer, carrying case, instructions and 4 x 1.5V AA batteries.

WR686-10 HI98194 Multiparameter meter

Accessories and spares

- WR687-04** Spare pH sensor
- WR687-08** Spare conductivity (EC) sensor
- WR687-12** Spare dissolved oxygen (DO) sensor
- WR687-16** Accessory pH/ORP sensor
- WR687-20** Spare sensor housing only, with 4m cable*
- BL610-15** Spare battery, 1.5V (4 required)

* Other cable lengths up to 20m are available - details on request.



WR686

Water Testing

Multiparameter Meters, LAQUA F-series

Horiba

- ◆ Model F-74BW: Benchtop, 2-channel, multiparameter meter for routine laboratory analysis of pH, ORP, ions, conductivity, resistivity, salinity and TDS
 - Large, twin line, custom backlit LCD and membrane keypad operation
 - 999 reading memory
- ◆ Model F-74: High specification, 2-channel meter for pH, ORP, ions, conductivity, resistivity, salinity and TDS with touchscreen operation, colour LCD readout, numeric, graphical or analogue display selectable, USP/EP/JP/CP conductivity standards support, analogue, USB printer/PC and flash memory extension outputs
 - 2000 reading memory
 - GLP function and validation facility with on-board operator navigation and guidance
 - Multiple operating languages: Japanese, English, Chinese, Korean
- ◆ Simultaneous reading and temperature display
- ◆ Supplied with probe stand and 360° rotating, swing-arm clamp

| Catalogue No. | | WR720-15 | WR720-35 |
|--------------------------------|---|--|--|
| Model | | F-74BW | F-74 |
| Parameters | Channel 1 Channel 2 | pH, ORP, Ion Conductivity, resistivity salinity, TDS | pH, ORP, Ion Conductivity, resistivity salinity, TDS |
| Ranges x resolution (accuracy) | pH mV (ORP) Ion conc. Conductivity, K = 0.1 K = 1 K = 10 Resistivity, K = 0.1 K = 1 K = 10 Salinity TDS Temperature, ATC Display | -2 to +19.999 x 0.001 (±0.05 ±1 digit) -1999.9 to +1999.9 x 0.1 (±0.1 ±1 digit) — both models 0.00mg/l to 999g/l x 3 digits (±0.5% ±1 digit) — both models 0.0 S to 1.999S x 0.0001 (±0.5% ±1 digit) — both models 0.000 S to 19.99S x 0.001 (±0.5% ±1 digit) — both models 0.00 S to 199.9S x 0.01 (±0.5% ±1 digit) — both models 0 to 1.999MΩhm x 0.0001 (±0.5% ±1 digit) — both models 0 to 19.99kΩhm x 0.001 (±0.5% ±1 digit) — both models 0 to 199.9kΩhm x 0.1 (±0.5% ±1 digit) — both models 0 to 80.00ppt x 0.01 (±0.5% ±1 digit) — both models 0.01mg/l to 100g/l x 0.01mg/l (±0.5% ±1 digit) — both models 0 to 100.0°C x 0.1 (±0.1% ±1 digit) — both models -30 to 130.0°C x 0.1 (±0.1% ±1 digit) — both models | -2 to 20.000 x 0.01/0.001 (±0.001 ±1 digit) |
| Autocalibration | pH/Ion | Up to 5 point — both models | |
| Memory | | 999 readings | 2000 readings |
| Display | | Monochrome, backlit LCD | Colour graphics LCD |
| Outputs | | USB/RS232 printer ports | Analogue output, USB/RS232 printer PC ports, USB flash drive memory expansion port |
| Dimensions W x D x H | mm | 170 x 174 x 73 — both models | |
| Weight | kg | 0.5 | |

Multiparameter Meters, LAQUA F-series

As described. Supplied with swing-arm probe holder, stand and a.c. adapter for 100-240V single phase supplies.

WR720-15 F-74BW

WR720-35 F-74



WR720-35 in use, WR720-15 is similar

Accessories

PJ294-08 3-in-1 pH electrode, plastic bodied, waterproof

Tough electrodes

Robustly constructed, toughened glass, 3-in-1 electrodes with rapid response membrane and increased stability reference system. Waterproof.

| | Sample type | Operating range, °C | L x dia. mm |
|-----------------|-----------------|---------------------|-------------|
| PJ294-12 | General purpose | 0 to 100 | 115 x 23 |
| PJ294-16 | High viscosity | 0 to 60 | 120 x 8 |
| PJ294-22 | Micro, >50 l | 0 to 60 | 102 x 3 |
| PJ294-24 | Deep | 0 to 100 | 200 x 7 |

Conductivity probes

CU662-72 Accessory K = 0.1 conductivity probe

CU662-75 Spare K = 1 conductivity probe

CU662-79 Accessory K = 10 conductivity probe

CU662-81 USB cable to connect meter to the user's PC

CU662-83 Impact printer, 230V 50/60Hz. Requires CU662-89 for connection to meter

CU662-86 Printer paper rolls, pack of 20

CU662-88 Ink ribbons, pack of 5

CU662-89 Printer cable to connect CU662-83 to meters. 1.5m long

Water Testing

Hach Portable Turbidimeters

Direct reading, portable turbidimeters providing ease of use and accuracy in the turbidity measurement.

- ◆ Choice of models:
 - 2100QIS, ISO 7027 design criteria compliant
 - 2100Q, USEPA Method 180.1 design criteria compliant
- ◆ Two-detector optical system with sample colour compensation, light fluctuation and straylight compensation
- ◆ Innovative Rapidly Setting Turbidity™ mode to provide accurate, repeatable measurements
- ◆ On-screen, assisted calibration and verification with intuitive screen interface
- ◆ Up to 500 measurements automatically stored for easy access and backup including date and time, operator ID reading mode, sample ID, sample number, units, calibration item, status, error messages and result
- ◆ Accessory USB and power module allows data transfer to the users' PC without additional software

Turbidimeters, Hach 2100QIS and 2100Q

As described. Supplied with primary calibration standards (20, 100, 800NTU), 10NTU primary verification standard, 6 sample cells, instrument manual, silicone oil and cloth, 4 x 1.5V alkaline batteries and carrying case.

- WR795-15** 2100QIS
- WR795-20** 2100Q
- WR796-08** Battery eliminator, 110-230V 50/60Hz a.c.
- WR796-10** Power/download module. With USB connection and cable. For 110-230V 50/60Hz supplies. Requires WR796-11 for operation
- WR796-11** NiMH rechargeable AA batteries for download module WR796-10, pack of 6
- BL610-15** Spare 1.5V battery (4 required)

| | | | |
|------------------------------|------------|--|------------------------|
| <i>Model</i> | | 2100QIS | 2100Q |
| <i>Regulatory compliance</i> | | ISO7027 | EPS Method 180.1 |
| <i>Range x resolution</i> | <i>NTU</i> | 0 to 1000 x 0.01 (0 to 9.99), 0.1 (10 to 99.9) and 1 (100 to 1000) — both models | |
| <i>Accuracy</i> | | ±2% of reading plus straylight — both models | |
| <i>Repeatability</i> | | ±2% of reading or ±0.01NTU (whichever is greater) — both models | |
| <i>Straylight</i> | <i>NTU</i> | <0.02 — both models | |
| <i>Light source</i> | | LED @ 860nm | Tungsten filament lamp |
| <i>Power supply</i> | | 4 x 1.5V AA batteries — both models | |
| <i>Overall H x W x D</i> | <i>mm</i> | 77 x 107 x 229 — both models | |
| <i>Weight</i> | <i>g</i> | 618 — both models | |



WR795

Water Testing

Hach Laboratory Turbidimeters, TL2300-series

Highly sophisticated, nephelometric turbidimeters for laboratory analysis of suspended particles in liquids.

- ◆ Regulatory Method specific models:
 - TL2300/TL2350: EPA Method 180.1
 - TL2310/TL2360: ISO7027, DIN EN27027, DIN 38404, NFT9033
- ◆ Intuitive user interface with large, full colour touchscreen display
- ◆ Optical cell air purge system, requiring a source of dry nitrogen or instrument-quality air
- ◆ Instruments display result only after sample stability is detected

| Model | TL2300 | TL2310 | TL2350 | TL2360 |
|-------------------|--|--|--|--|
| Method | EPA | ISO/DIN | EPA | ISO/DIN |
| Units | NTU, EBC | FNU, NTU | NTU, EBC, Abs., %T, mg/l | FNU, FAU, NTU, Abs., %T, mg/l |
| Ranges | NTU 0 to 4000 (ratio on) 0 to 40 (ratio off) FNU – EBC 0 to 980 (ratio on) 0 to 9.8 (ratio off) FAU – Abs. – %T – mg/l – | 0 to 1000 – 0 to 1000 – – – – – | 0 to 10000 (ratio on) 0 to 40 (ratio off) – 0 to 2450 (ratio on) 0 to 9.8 - (ratio off) – 0 to 1.0 1.0 to 100.0 1 to 100 | 0 to 10000 (ratio on) 0 to 40 (ratio off) 0 to 1000 (ratio on) 0 to 40 (ratio off) 0 to 2450 (ratio on) 0 to 9.8 - (ratio off) 20 to 1000 0 to 2.00 1.0 to 100.0 0 to 100 |
| Light source | Tungsten filament | LED at 860nm | Tungsten filament | LED at 860nm |
| Sample size | 95 x 25mm round sample cell, minimum 20ml volume - all models | | | |
| Output | 2 x USB ports for flash drive or external printer - all models | | | |
| Datalogging | 2000 records, including results, verification and calibration logs - all models | | | |
| Overall H x W x D | mm | 153 x 395 x 305 - all models | | |
| Weight | kg | 3 - all models | | |

Turbidimeters, Hach TL2300-series

As specified. Supplied with silicone oil, oiling cloth, filter assembly, 6 x 95 x 25mm (1") cells with caps, Gelex secondary turbidity standards kit, Stabcal calibration kit, dust cover and power supply for 100-240V supplies.

- WR800-14** TL2300
- WR800-16** TL2310
- WR810-20** TL2350
- WR810-25** TL2360

WR812-08 Spare sample cells for WR800- and WR810-series, pack of 6



WR800/WR810

Water Testing

COD Tube Test Kits, Hach

A scaled down version of the traditional digestion test, greatly reducing the hazards associated with contact between the technician and the reagents. Ready-to-use cuvette tests containing predispensed volumes of COD testing reagents are cost-efficient and environmentally benign. Developed to conform to the requirements of ISO15705. The cuvettes are borosilicate glass with plastic screw caps, resisting up to 6kPa (bar) pressure. Supplied in packs of 24. Require a block heater and photometer to complete the test.

- WR818-10** 0 to 150mg/l
- WR818-20** 0 to 1000mg/l

Block heater for COD testing - see *BK280-55* with *BK282-04* blocks.

Spectrophotometer - see *WR830-45*.

Hach-Lange Spectrophotometer, DR3900

Highly accurate, water analysis instrument designed to help meet regulatory requirements for drinking, waste, boiler or cooler water.

- ◆ Menu-driven, backlit, touchscreen interface for rapid operation
- ◆ RFID tagging technology provides sample/user/location ID and rapid data transfer
- ◆ Over 220 pre-programmed Hach-Lange methods stored internally, plus 100 user programmes can be entered
- ◆ Automatic test identification using accessory, bar-coded reagent cuvettes
- ◆ Automatic rotation of cuvette tests with averaging of 10 readings and outlier rejection
- ◆ Reference detector monitors and compensates for optical fluctuations and lamp ageing
- ◆ 3 x USB and 1 x ethernet output ports

| | | |
|----------------------|----|--|
| Wavelength range | nm | 320 to 1100 x 1 |
| Wavelength accuracy | nm | ±1.5 (within 340 to 900nm) |
| Spectral Bandwidth | nm | 5 |
| Readout modes | | Transmittance (%), Absorbance, Concentration, Scanning (wavelength, time) |
| Wavelength selection | | Automatic, based on method selected |
| Photometric accuracy | | 5mAbs from 0.0 to 0.5Abs 1% from 0.50 to 2.0Abs |
| Data storage | | 2000 measured values (result, date, time, sample ID, user ID) |
| Cell accommodated | | 10mm dia. Lange AccuVac® vials, 10mm, 50mm, 1 inch rectangular cells, 13mm and 1 inch dia. cells |
| Overall H x W x D | mm | 151 x 350 x 255 |
| Weight | kg | 4.2 |

Spectrophotometer, Hach-Lange DR3900

As described. Supplied with cell holder for 10mm diameter Lange AccuVac® 10mm or 1 inch square cuvettes or 1 inch diameter tubes, operating manual and a.c. adapter requiring a 100-240V 50/60Hz single phase supply.

- WR830-45** DR3900
- WR832-08** Sample cells, 10mm square, matched pair
- WR832-15** Sample cells, 1 inch square, matched pair
- WR832-19** RFID set for sample identification, including RFID locator, user, location and sample tags
- WR832-49** Spare tungsten-halogen bulb, 6V, 10W, for WR830-45

Both Hach and Lange cuvette tests and other cell sizes are available - *details on request*.



WR818



WR830-45 in use

Water Testing

Portable Laboratories, Hach DREL/1900

Complete systems with reagents and apparatus for 24 common water quality tests, incorporating the DR1900 spectrophotometer.

- ◆ Choice of 2 systems:
 - Complete
 - Industrial

The systems comprise:

- ◆ DR1900 Spectrophotometer operating from 100-240V 50/60Hz mains supplies or from Lithium iron rechargeable batteries (included)
- ◆ Procedures and Instrument Manual
- ◆ Digital Titrator
- ◆ Reagents and apparatus for tests as indicated

Spectrophotometer DR1900 specifications

| | | |
|-----------------------------|------|--|
| Wavelength range | nm | 340 to 800 x 1 |
| Wavelength accuracy | nm | ±2 |
| Bandwidth | nm | 5 |
| Photometric measuring range | Abs. | 0 to 3 |
| Photometric accuracy | Abs. | ±0.003 |
| Readout modes | | Absorbance, Transmittance, Concentration |
| Wavelength selection | | Automatic, based on method selected |
| Photometric calibration | | Automatic at start up |
| Data storage | | Up to 500 measurements, more than 220 pre-programmed Hach or user method protocols |
| Interface | | Micro USB |
| Cell holder | | 10mm, 13mm, 1 inch diameter, 10mm or 1 inch rectangular cells |
| Light source | | Long-life Xenon flash |
| Overall H x W x D | mm | 98 x 178 x 267 |
| Weight | kg | 1.5 |

Portable Laboratories, DREL/1900

Comprising instruments, apparatus, reagents and instructions for the common water quality tests as specified. Supplied in two robust carrying cases, each 530 x 290 x 280mm with manuals, vial adapters and 4 x 1.5V rechargeable batteries giving up to 15 days field operation (less if the display backlight function is switched on) with charger for 100-240V 50/60Hz a.c. supplies. Combined weight 30kg.

WR840-37 DREL/1900 Complete

WR840-47 DREL/1900 Industrial

Accessory

WR796-10 Power/download module. With USB connection and cable. For 110-230V 50/60Hz supplies.

Turbidimeters, Hach 2100QIS and 2100Q

Choice of models for either ISO7027 (2100QIS) or USEPA Method 180.1 (2100Q) design compliance. Provide turbidity measurement in the range 0 to 1000NTU. Supplied with primary calibration standards (20, 100, 800NTU), 10NTU primary verification standard, 6 sample cells, instrument manual, silicone oil and cloth, 4 x 1.5V alkaline batteries and carrying case.

- for full details, see WR795-series.

| Tests included: | Portable Laboratory | |
|----------------------------------|---------------------|------------|
| | Complete | Industrial |
| Acidity | x | — |
| Alkalinity, (CaCO ₃) | x | x |
| Ammonia (Nitrogen) | x | x |
| Bromine | x | x |
| Calcium | x | x |
| Chloride | x | x |
| Chlorine, free | x | x |
| Chlorine, total | x | x |
| Chromium | x | x |
| Colour | x | x |
| Copper | x | x |
| Hardness, (CaCO ₃) | x | x |
| Iodide | x | x |
| Iron, Total | x | x |
| Manganese | x | x |
| Molybdate | — | x |
| Nitrate, (N) | x | x |
| Nitrite, (N) | x | x |
| Oxygen, binders | — | x |
| pH | x | x |
| Phosphate | x | x |
| Silica | x | x |
| Sulphate | x | x |
| Sulphide | x | — |
| Sulphite | x | x |
| Suspended solids | x | x |

Portable conductivity and pH meters – see *Conductivity and pH sections*.



Inset: DR1900 in use



WR840-37/WR840-47 with accessory turbidimeter and pH meter



WR795

Water Testing

Hach Water test Kits

A range of simple water test kits for the most commonly required parameters.

Alkalinity Test Kit AL-AP

Determines both phenolphthalein (P) and total (M) alkalinity using Drop Count titrations.

Range: 0.4 to 8 or 1 to 20ppg

Smallest increment: 0.4 or 1ppg as calcium carbonate

With reagents for approximately 100 tests each P and M alkalinity.

WS400-10 Alkalinity Kit

Note: ppg = grains/U.S.gallon. 1ppg = 17ppm.

Chlorine Test Kit CN-70

Determines free or total chlorine using the DPD/Colour disc method.

Ranges: 0 to 0.7 or 0 to 3.5mg/l

Smallest increment: 0.02 or 0.1mg/l

With reagents for approximately 100 tests.

WS410-15 Chlorine Kit

Hardness Test Kit 5-B

A simple Drop Count/EDTA test using a measuring spoon to dispense reagent.

Range: 1 to 30ppg

Smallest increment: 1ppg

With reagents for approximately 100 tests.

WS420-12 Hardness Kit

Note: ppg = grains/U.S.gallon. 1ppg = 17ppm.

Iron Test Kit IR-18A (low)

Uses Colour Disc method on a 25ml sample.

Range: 0 to 1mg/l

Smallest increment: 0.02mg/l as Iron

With reagents for approximately 100 tests.

WS430-10 Iron Kit Low

Iron Test Kit IR-18B (high)

Uses Colour Disc method on a 5ml sample.

Range: 0 to 10mg/l

Smallest increment: 0.2mg/l as Iron

With reagents for approximately 100 tests.

WS430-13 Iron Kit High

Ammonia Test Kit

A simple test utilising the Colour Disc method on a 5ml sample. Ideal for field use by students.

Range: 0 to 2.4mg/l

Smallest increment: 0.2mg/l as ammonia nitrogen

With reagents for approximately 100 tests.

WS440-11 Ammonia Disc Kit

Nitrite Test Kit

A simple test utilising the Colour Disc method on a 5ml sample.

Range: 0 to 0.4mg/l

Smallest increment: 0.02mg/l as nitrite nitrogen

With reagents for approximately 100 tests.

WS440-30 Nitrite Disc Kit

Dissolved Oxygen Test Kit OX-2P

A simple Drop Count method to produce a colour change. Each drop of titrant used equals 1mg/l of dissolved oxygen.

Range: 0.2 to 4 or 1 to 20mg/l

Smallest increment: 0.2 or 1mg/l as dissolved oxygen

With reagents for approximately 100 tests.

WS455-10 Dissolved Oxygen Kit

pH Test Kit 17-N

Uses a Colour Disc method with a wide range of pH reagents on a 5ml sample.

Range: 4 to 10pH units

Smallest increment: 0.5pH unit

With reagents for approximately 300 tests.

WS460-12 pH Kit

Phosphate Test Kit PO-19A

Includes filtration equipment to allow testing of turbid samples or samples that have suspended particulate matter. Uses a Colour Disc method on 0.5ml or 5ml samples.

Range: 0 to 5 or 0 to 50mg/l

Smallest increment: 0.1 or 1.0mg/l as phosphate

With reagents for approximately 100 tests.

WS470-25 Phosphate Kit



WS400-10



WS430-10



WS440-30



WS410-15



WS430-13



WS455-10



WS420-12



WS440-11



WS460-12



WS470-25

Water Testing

Portable Water Laboratory, Paqualab® 50

A portable testing system for monitoring key drinking water parameters on-site, even in remote areas.

- ◆ Meets WHO and EC guideline requirements
- ◆ Provides microbiological, chemical and physical testing facilities

Microbiological testing

Paqualab® 50 provides the facility to indicate harmful bacteria and virus presence using membrane filtration and incubation of faecal and total coliforms. A manual vacuum filtration unit allow a measured sample to be drawn through a sterile gridded membrane filter and then applied to an absorbent pad which has been pre-soaked in membrane lauryl sulphate medium and held within a reusable aluminium petri dish. The sample pad is then incubated in a portable incubator compartment. Up to 50 dishes can be simultaneously incubated in two separate compartments at +37°C or +44°C depending on method (chambers are individually switchable). Components and consumables for up to 200 tests in total are included.

Chemical and Physical testing

Instruments and apparatus are provided enabling measurement of pH, temperature, conductivity, TDS, turbidity and photometric testing of chlorine, ammonia, nitrates and nitrites.

Portable Water Laboratory Paqualab® 50

As described. With manual filtration unit, separate incubators with +37°C or +44°C setting and "heat" indicator LED. Also included are pH/C, conductivity/TDS and turbidity meters, a photometer with reagents for testing chlorine, ammonia, nitrates and nitrites, and necessary equipment and consumables/reagents to conduct up to 50 microbiological tests simultaneously (200 total), all contained in a rugged aluminium case. Overall 810 x 620 x 800mm W x D x H. Weight 30kg. the incubators require a 110-240V 50/60Hz single phase supply or can be run from a 12V vehicle battery using the cigar lighter plug or crocodile clip attachments provided. A rechargeable battery is also included for temporary field operation of the incubators.

WS510-25 Paqualab® 50

Spares and accessories

- WS513-04** Lauryl sulphate medium, pack 38.1g for 200 coliform tests
- WS513-06** Slanetz and Bartley medium, pack 100g for 200 faecal streptococci tests
- WS513-08** Absorbent pads and membranes only, pack of 200
- WS513-15** Coliform starter pack, membranes, pads and medium for 200 tests
- WS513-20** Faecal streptococci starter pack, membranes, pads and medium for 200 tests
- WS513-30** Aluminium petri dishes, pack of 25



WS510-25

Test Strips

Single or multiple parameter test strips especially formulated for water quality measurement. The unique design incorporates an aperture within the test strip that holds an indicator-treated membrane ensuring complete immersion in the test sample. Colour intensity is directly proportional to concentration of the test parameter in the sample.

- ◆ Rapid response
- ◆ Safe to use and transport
- ◆ Low cost per test
- ◆ Excellent reproducibility

As described. Supplied in bottle packs of strips with ranges as indicated and colour comparison key label.

| | Parameter(s) | Method: Range/increments, mg/l (except pH) | Pack qty. |
|---------------------------|--|---|-----------|
| Single parameter | | | |
| WS550-10 | Free chlorine | A: 0, 1, 2, 3, 4, 5, 6, 7 B: 0, 0.05, 0.1, 0.2, 0.4, 0.6, 0.8, 1.2 | 50 |
| WS550-15 | High free chlorine | 0, 1, 2, 5, 10, 20, 40, 80, 120 | 50 |
| WS550-20 | Total chlorine | A: 0, 0.1, 0.2, 0.5, 0.8, 4, 10 B: 0, 0.05, 0.1, 0.15, 0.2, 0.5, 1 | 50 |
| WS550-25 | Iodine | A: 0, 0.5, 1, 2, 3, 4, 5 B: 0, 0.02, 0.05, 0.1, 0.2, 0.3, 0.4 | 50 |
| WS550-34 | Iron (Fe ₂ /Fe ₃) | 0, 0.02, 0.05, 0.1, 0.2, 0.3, 0.5, 0.75, 1, 2, 5 | 25 |
| WS550-35 | Copper (Cu/Cu ₂) | 0, 0.5, 1, 2.5, 5 | 25 |
| WS550-40 | Peroxide (H ₂ O ₂) | 0, 0.5, 2, 5, 10, 25, 50, 100 | 50 |
| WS550-60 | Total Hardness (Ca) | 0, 40, 80, 120, 180, 250, 425, 1000 | 50 |
| Multiple parameter | | | |
| WS560-15 | Free chlorine Total chlorine | 0, 0.1, 0.2, 0.5, 1, 2.5, 5 0, 0.1, 0.2, 0.5, 1, 2.5, 5 | 30 |
| WS560-25 | Nitrate Nitrite | 0, 0.5, 2, 5, 10, 20, 50 0, 0.15, 0.3, 1, 1.5, 3, 10 | 50 |
| WS560-30 | pH Total alkalinity | 6, 6.5, 7, 7.5, 8.0, 8.5, 11 0, 40, 80, 120, 180, 240, 720 | 50 |
| WS560-44 | pH Total Alkalinity Total Hardness (Ca) Free & Total chlorine | 6, 6.5, 7, 7.5, 8, 8.5, 9 0, 40, 80, 120, 240, 360 0, 50, 120, 180, 250, 425 0, 0.1, 0.2, 0.5, 1, 2.5, 5 | 50 |



WS550, WS560

Water Testing

Test Strips continued

Arsenic Test Kits

Comprising reaction vessels, reagents and test strips to conduct colorimetric tests under modified Gutzeit methodology. Reaction of the reagents and sample generates arsine gas (if arsenic is present) which is brought into contact with a test pad impregnated with mercuric bromide indicator. After a specified exposure period (generally 14 minutes) the pad is removed and the colour compared with a colour chart supplied. In packs of tests and with detection limit ranges as indicated.

| | Range/increments, g/l (ppb) | Pack quantity |
|-----------------|---|------------------|
| WS565-44 | <1, 2, 3, 4, 5, 6, 7, 8, 10, 13, 20, 25, 30, 40, >50, >80, >160 | 50 |
| WS565-47 | 0, 5, 10, 20, 60, 100, 300, 500, >500 | 100 |

Other ranges are available - details on request.

Chlorine Test Strips, J-Quant®

For routine checks of chlorine levels in reservoirs, water mains and swimming pools and to monitor the concentration of chlorine-based sanitisers in these applications. Supplied in packs of 100 and with ranges as indicated.

| | |
|-----------------|--------------------------------------|
| WS574-10 | 0, 0.5, 1, 3, 5, 10, 20mg/l |
| WS574-20 | 0, 25, 50, 100, 200, 300mg/l |
| WS574-30 | 0, 50, 100, 250, 500, 1000mg/l |
| WS574-40 | 0, 1000, 2500, 5000, 7500, 10000mg/l |

J-Quant® is a registered trademark of Johnsons Test Papers Ltd.

Bacteria Check

Tests for the presence of coliform bacteria. Follows the APHA Standard Method 9221D screen test for total coliforms in potable water. U.S. EPA compliant. Simple test involves filling a 100ml sterile bottle with a water sample, capping and standing for 24 hours at room temperature. Indicating media within the bottle will turn purple if coliforms are present or yellow if absent. Supplied in a pack of 12.

WS580-10 Bacteria check, 100ml bottles, pack of 12



WS565-44



WS574



WS565-47



WS580-10

Water Testing

Photometer, Exact® Micro 20

Dual wavelength (525nm and 638nm), portable photometer using patented technologies (solutions and/or reagent dosing strips) to analyse a wide range of parameters within water samples, on-site.

- ◆ 20mm pathlength cell with 4ml sample volume requires minimal reagents, reducing cost
- ◆ Built-in timer for accurate testing
- ◆ 20 reading memory for each test regime
- ◆ Waterproof housing to IP67 protection level

As described. Supplied as a meter only. Overall W x D x H 50 x 30 x 165mm. Weight 181g. Requires, but is not supplied with, 4 x 1.5V AAA batteries and parameter strips/reagents for operation.

WS585-55 Exact Micro 20

BL610-08 1.5V AAA batteries (4 required)

WS585-85 Carrying case for Exact Micro 20 meter



WS585-55

Test strips/reagents for WS585 Photometer

For use with photometers of wavelength and in parameter ranges, chemistries and packs as indicated.

| | Parameter range x resolution, ppm | Chemistry | Pack qty. strips |
|-------------------------|---|---|------------------------|
| Single Parameter | | | |
| WS587-04 | Alkalinity, total, 1 to 320 x 0.1/1 | Alizarin red S + citrate | 100 |
| WS587-14 | Aluminium, 0.02 to 1.5 x 0.01 | PV | 50 |
| WS587-19 | Ammonia, 0 to 2.0 x 0.01 | Salicylate method | 25 |
| WS587-24 | Calcium (CaCO ₃), 18 to 420 x 1 | Oxalic acid | 50 |
| WS587-29 | Total Chlorine (DPD-3)**, 0 to 5 x 0.01 | KI | 100 |
| WS587-34 | HR Chlorine, 0.3 to 300 x 1 | KI + buffer | 50 |
| WS587-39 | Chloride (NaCl), 1 to 430 x 1 | Silver (ppt) | 25 |
| WS587-44 | Chromium (VI), 0 to 1.8 x 0.01 | Diphenylcarbazine | 50 |
| WS587-49 | Copper (Cu ²⁺), 0 to 11 x 0.01 | Biquinoline | 50 |
| WS587-54 | Cyanide, 0 to 3 x 0.01 | Isonicotinic/Barbituric acid | 50 |
| WS587-59 | Fluoride, 0.03 to 1.45 x 0.01 | SPADNS | 25 |
| WS587-65 | Total Hardness (CaCO ₃), 4 to 300 x 1 | Phthalein purple | 50 |
| WS587-74 | LR Hydrogen Peroxide, 0 to 2 x 0.01 | DPD + PO ₄ + MoO ₄ + KI | 50 |
| WS589-03 | Total Iron Fe ²⁺ / Fe ³⁺ , 0.04 to 8 x 0.01/0.1 | TPTZ + PP | 50 |
| WS589-08 | Manganese, 0.02 to 1.5 x 0.01 | PAN + cyanide | 24 |
| WS589-13 | Nitrate (NO ₃), 0.12 to 30 x 0.01/0.1 | Zinc reduction | 50 |
| WS589-18 | Nitrite (NO ₂), 0 to 1.8 x 0.01 | Chromotropic acid | 50 |
| WS589-23 | pH, pH 5.5 to 8.8 x 0.01 | Phenol red | 100 |
| WS589-28 | pH (BT reagent), pH 4.5 to 9 x 0.01 | Bromothymol blue + thymol blue | 50 |
| WS589-33 | Phosphate, 0 to 4 x 0.01/0.1 | Molybdate method | 50 |
| WS589-38 | Sulphate, 1 to 250 x 1 | Barium (ppt) | 50 |
| WS589-42 | Sulphide, 0 to 1.7 x 0.01 | DPD + FeCl ₃ | 50 |
| Multiparameter | | | |
| WS589-85 | Bromine (DPD-1), 0.1 to 12 x 0.01/0.1 | DPD | 100 |
| | Free Chlorine (DPD-1), 0 to 5 x 0.01 | DPD | |
| | Chlorine dioxide (DPD-1), 0 to 10 x 0.01 | DPD | |
| | Permanganate (DPD-1), 0 to 5 x 0.01 | DPD | |
| WS589-90 | Total Chlorine (DPD-4), 0 to 5 x 0.01 | DPD + KI | 50 |
| | Ozone (DPD-4), 0 to 5 x 0.01 | DPD + KI | |
| | Peracetic acid (PAA), 0.02 to 6 x 0.01 | DPD + KI | |

**Requires Free Chlorine DPD-1 test WS587-34 to be run beforehand.

Water Testing

COD Tube Test Photometer

Lovibond®

COD Tube Test Photometer, Vario MD 100

A compact, precise, photometer dedicated to COD measurement in water samples, using accessory tube test reagents for accuracy, convenience and safety, and an accessory block heater for sample digestion.

- ◆ Choice of ranges:
 - low 0 to 150mg/l
 - medium 0 to 1500mg/l
 - high 0 to 15000mg/l
- ◆ Portable, battery-powered photometer
- ◆ Long-life LED illumination with temperature compensation
- ◆ Waterproof sample chamber

| | | | |
|--------------------------|---------------|---|---------------|
| <i>Model</i> | | COD Vario MD 100 | |
| <i>Ranges</i> | <i>low</i> | <i>mg/l O₂</i> | 0 to 150 |
| | <i>medium</i> | <i>mg/l O₂</i> | 0 to 1500 |
| | <i>high</i> | <i>mg/l O₂</i> | 0 to 15000 |
| <i>Accuracy</i> | | % | ±3 |
| <i>Optics</i> | | Temperature compensated LED's and interference filters providing 430, 530, 560, 580, 610 and 660nm wavelengths with photosensor amplifier | |
| <i>Measurement time</i> | <i>secs.</i> | 15 | |
| <i>Readout</i> | | LCD | |
| <i>Overall W x D x H</i> | | <i>mm</i> | 75 x 155 x 35 |
| <i>Weight</i> | | <i>g</i> | 260 |
| <i>Power</i> | | 4 x AAA batteries | |

As described. Supplied with battery and instructions. Without COD tubes.

WS810-20 COD tube test photometer MD 100

BL610-08 Spare 1.5V AAA battery (4 required)

Tube Tests

16mm diameter, screw cap tubes containing COD reagents to test within ranges as specified, once digested in an accessory block heater. Supplied in packs of 25.

| | | |
|--------------------|---------------------|---------------------|
| | With mercury | Mercury free |
| 0 to 150mg/l, LR | WS810-42 | WS810-43 |
| 0 to 1500mg/l, MR | WS810-45 | WS810-46 |
| 0 to 15000mg/l, HR | WS810-49 | WS810-51 |



WS810-20 in use

Block Heater

stuart®

For uniform and stable heating of test tubes, Eppendorf tubes and cuvettes.

- ◆ Maximum temperature 200°C
- ◆ Digital control with bright LED display
- ◆ 'Hot warning' light illuminates whenever block temperature exceeds 70°C even when unit is switched off (but remains connected to the mains supply socket)
- ◆ Heat to 100°C in less than twelve minutes

| | | |
|----------------------------|-----------|--------------------|
| <i>Model</i> | SBH200D | |
| <i>Range</i> | °C | ambient +8 to +200 |
| <i>Stability (at 37°C)</i> | ±°C | 0.1 |
| <i>Uniformity</i> | at 37°C | ±°C 0.1 |
| | at 130°C | ±°C 1.0 |
| <i>Blocks accepted</i> | 2 | |
| <i>Heater power</i> | <i>W</i> | 300 |
| <i>Overall, W x D x H</i> | <i>mm</i> | 235 x 310 x 115 |
| <i>Weight</i> | <i>kg</i> | 2.3 |

Block Heater, Stuart

As described. With 'power on' and 'hot warning' lamps and block extraction tool. For 230V 50Hz single phase supplies. Without blocks.

BK280-55 SBH200D

Accessory Aluminium block

Supplied singly.

BK282-12 for 12 x 16.5mm diameter tubes



BK280-55 in use

Water Testing

Dipslides, Standard **COPE**

An easy-to-use system for monitoring microbes in industrial fluids.

- ◆ For use in applications including:
 - compliance with L8 (Legionella bacteria control in water systems) directives set out by the UK Health and Safety Executive
 - microbial control to extend working life of fluids, filters and pumps
 - corrosion prevention in machines, tanks and pipes by minimising the amount of microbial metabolites
 - enhancing the microbial quality of final products
- ◆ Available in three versions:
 - Standard TTC: for determination of total bacterial counts in industrial fluids. With TTC medium
 - Standard Combi: a two-medium dipslide for checking total bacterial counts as well as yeast and fungi. With TTC medium and Rose-Bengal medium
 - Standard S: For monitoring anaerobic sulphate reducing bacteria. Diagnostic gel test

Principles

Comprise plastic outer sample tube and screw cap which is attached to an inner plastic sampling paddle. Agar medium slides are cast into the paddle (Standard Combi has TTC and Rose-Bengal agar cast respectively on alternate sides). In use, the paddle is removed from the outer tube and immersed in the liquid under test or exposed to liquid spray or mist then returned to the outer tube and incubated. Type S has a capillary tube instead of a paddle into which the fluid is drawn and the capillary tube then immersed in sulphate-rich gel contained in the outer tube, before incubation. Any microbial growth appearing after incubation can be interpreted with the aid of a card giving approximate contamination levels in terms of colony numbers.

Dipslides, Standard

As described. Supplied in packs of tests as indicated, with results interpretation card and instructions.

- HT802-20** Standard TTC, pack 10
- HT802-40** Standard Combi, pack 10
- HT802-60** Standard S, pack 10

Disinfectants – see CL900.

Portable Incubator

Portable Incubator, Challenger MX25

Versatile, robust, rectangular portable incubator for small scale incubation of samples in the field or where use of a standard incubator is impractical. Temperature range ambient +5°C to +45°C, variation $\pm 5^\circ\text{C}$ (at 20°C ambient). Capacity 5.2 litres. An overtemperature cut-out engages at +70°C. Solid-state heating and control electronics are sealed in the case and a heat reservoir chassis ensures even heat distribution and rapid heat recovery to set temperature. With moulded co-polymer case, transparent polycarbonate lid and spirit thermometer. With a separate, external, universal power supply for increased safety and operation on 100-240V a.c. supplies. An accessory cigar lighter plug and cable allows alternative 12V d.c. operation in the field. Usable internal dimensions 180 x 150 x 180mm W x D x H, overall 320 x 260 x 270mm W x D x H. Weight 1.9kg.

- IN085-75** Challenger MX25
- IN085-77** Cigar lighter plug cable for IN085-75



HT802



IN085-75 in use

Water Testing

Spectrophotometer Model 6320D

JENWAY

Single-beam, visible spectrophotometer system suited to environmental and water analysis.

- ◆ Microprocessor controlled, menu driven operation
- ◆ High resolution, graphics liquid crystal display
- ◆ Dual display mode gives continuous readout of selected wavelength and results
- ◆ Sealed optical system is protected from degradation by harsh environments
- ◆ Multi-purpose sample holder accepts 10 and 50mm path length square cuvettes, 13, 16 and 25mm diameter test tubes, and 16mm and 24mm screw cap vials (optional Aquanova reagent kit cell holder available)
- ◆ Dome shaped lid accommodates test tubes with a height of up to 105mm

| | | |
|-------------------------|----------------|---|
| Model | | 6320D |
| Ranges | | Test methods, Photometrics (Abs./%T) |
| Wavelength | range nm | 320 to 1000 |
| | resolution nm | 1 |
| | accuracy nm | ±2 |
| Bandwidth | nm | 8 |
| Transmission | range % T | 0 to 199.9 |
| | resolution % T | 0.1 |
| | accuracy % T | ±1 |
| Straylight | % T | <0.5 |
| Absorption | range A | -0.300 to 1.999 |
| | resolution A | 0.001 |
| Concentration | range C | -300 to 1999 |
| | resolution C | 0.1 to 1 |
| Factor | | 9999.999 to 0.001 |
| Photometric noise level | % | <1 |
| Photometric stability | % | <1 per hour after 15 minutes |
| Units | | ppm, mg/l, g/l, M, %, blank |
| Display | | Custom graphics LCD with 20-character test name readout |
| Outputs | | Analogue (0 to 1999V d.c.), RS232 serial |
| Light source | | Tungsten-Halogen |
| Overall H x W x D | mm | 160 x 365 x 272 |
| Weight | kg | 6 |

Accessories and Spares

SJ364-05 Tungsten-halogen lamp for SJ360-10 and SJ360-20

SJ364-06 Xenon lamp module for SJ360-40 and SJ360-50

SJ364-09 Cell holder for 10mm cells

SJ364-18 Cell holder, adjustable, for 20 to 100mm cells

Cell holder for 10mm square cuvettes, and 10mm, 16mm and 24mm diameter vials. Also required for use with Aquanova reagent kits.

SJ364-36 Aquanova cell holder

CT102-05 Square cuvettes, disposable PS, 10mm path length, 4ml, pack of 100

CS780-14 Square cuvettes, optical glass, 10mm path length

CS780-32 Rectangular cuvettes, optical glass, 50mm path length

Impact printer, 40 column, with connecting cable, rechargeable batteries and charger. A 220-240V 50Hz supply is required for the charger.

CU656-20 Impact printer

CU656-22 Paper roll for CU656-20

As described. Supplied with single 10mm cell holder, 100 x 10mm disposable cuvettes and instructions. For 230V 50Hz single phase supplies.

SJ360-20 6320D visible



SJ360-20

Water Testing

Single Parameter Meters

HANNA

Dedicated, ion-specific colorimeters offering rapid and accurate determinations in a convenient portable instrument. Ideal for use in water treatment analysis, testing drinking water and quality control.

- ◆ Direct reading LCD
- ◆ Reader/timer function counts down to appropriate time interval between measurement
- ◆ Silicon photocell detector
- ◆ Battery-powered, with automatic shutdown after 10 minutes of non-use
- ◆ CAL CHECK™ validation procedure ensures correct calibration
- ◆ LED or tungsten light source with working life as long as the instrument

Single Parameter Meters

Supplied with two sample cuvettes, 9V PP3 battery giving up to 40 hours operation and instruction manual. Overall dimensions as indicated. Weight 290g (except WS890-27 which is 420g). Require, but are not supplied with, related accessory reagent kits.

| | Ref. | Parameter | Range (resolution) mg/l | Filter nm | Overall H X W X D | Reagent kit |
|-----------------|----------|-----------------|----------------------------|--------------|----------------------|----------------|
| WS890-12 | HI-96712 | Aluminium | 0.00 to 1.00 (0.01) | 470 | 180 x 83 x 46 | WS894-10 |
| WS890-17 | HI-96715 | Ammonia | 0.00 to 9.99 (0.01) | 466 | 192 x 102 x 67 | WS894-15 |
| WS890-22 | HI-96716 | Bromine | 0.00 to 8.00 (0.01) | 525 | 192 x 102 x 67 | WS894-20 |
| WS890-27 | HI-96711 | Free chlorine | 0.00 to 2.50 (0.01) | 525 | 216 x 83 x 65 | WS894-25 |
| | | Total chlorine | 0.00 to 3.50 (0.01) | | | WS894-27 |
| WS890-32 | HI-96702 | Copper | 0.00 to 5.00 (0.01) | 555 | 180 x 83 x 46 | WS894-30 |
| WS890-37 | HI-97721 | Iron | 0.00 to 5.00 (0.01) | 525 | 143 x 103 x 51 | WS894-35 |
| WS890-42 | HI-96728 | Nitrate | 0.0 to 30.0 (0.1) | 525 | 192 x 102 x 67 | WS894-40 |
| WS890-47 | HI-96707 | Nitrite, low | 0.00 to 0.35 (0.01) | 525 | 192 x 102 x 67 | WS894-45 |
| WS890-52 | HI-96708 | Nitrite, high | 0.0 to 150.0 (0.1) | 585 | 180 x 83 x 46 | WS894-50 |
| WS890-57 | HI-96713 | Phosphate, low | 0.00 to 2.50 (0.01) | 610 | 180 x 83 x 46 | WS894-55 |
| WS890-62 | HI-96717 | Phosphate, high | 0.0 to 30.0 (0.1) | 470 | 180 x 83 x 46 | WS894-60 |
| WS890-72 | HI-96731 | Zinc | 0.00 to 3.00 (0.01) | 585 | 180 x 83 x 46 | WS894-70 |

Reagent Kits for 100 tests

For use only with meters as indicated in the main table.

| | Parameter |
|-----------------|-----------------|
| WS894-10 | Aluminium |
| WS894-15 | Ammonia |
| WS894-20 | Bromine |
| WS894-25 | Free chlorine |
| WS894-27 | Total chlorine |
| WS894-30 | Copper |
| WS894-35 | Iron |
| WS894-40 | Nitrate |
| WS894-45 | Nitrite, low |
| WS894-50 | Nitrite, high |
| WS894-55 | Phosphate, low |
| WS894-60 | Phosphate, high |
| WS894-70 | Zinc |

- BL610-25** 9V PP3 battery
- DT369-12** Spare cuvettes, pack of 4



Inset: WS890-37



Water Testing

Turbidity Meter HI93703-C

HANNA

- ◆ Microprocessor controlled
- ◆ LED light source
- ◆ Automatic range selection
- ◆ Two line LCD with error codes, messages and self diagnosis
- ◆ Battery saving auto shut-off after 5 minutes of non-use
- ◆ Supplied with non-toxic calibration standards
- ◆ Non-volatile memory of last calibration data

| | | |
|---------------------|------|--|
| Ranges (resolution) | FTU* | 0.00 to 50.00 (0.01) 50 to 1000 (1) |
| Accuracy | | ±0.5 FTU or ±5% reading - whichever is greater |
| Calibration | FTU* | Automatic at 0, 10 and 500 |
| Light source | | LED |
| Display | | Two line LCD |
| Power | | 4 x 1.5V AA batteries |
| Overall L x W x D | mm | 220 x 82 x 66 |
| Weight | g | 510 |

* FTU (Formazine Turbidity Unit). 1FTU = 1NTU.

Turbidity Meter, Hanna HI93703-C

As described. Supplied with non-toxic 0 FTU and 10 FTU calibration solutions in packs of 30ml, two cuvettes, batteries, instruction manual and carrying case.

WT095-10 HI93703-C

Accessories and Spares

- DT369-12** Spare measurement cuvettes, pack of 4
- WT097-12** Calibration solution, 0FTU, pack of 30ml
- WT097-16** Calibration solution, 10FTU, pack of 30ml
- BL610-15** Battery, 1.5V (4 required)



WT095 in use

Minikits

Lovibond®

Lovibond® Minikits

Titrimetric test kits supplied in compact box containing step-by-step instructions and all equipment and reagents for an average of 40 tests.

| | Ref. | Test | Range mg/l |
|-----------------|--------|-----------------------|------------|
| WT150-30 | AF 413 | Alkalinity, Total | 0 to 500 |
| WT154-10 | AF 416 | Calcium Hardness | 0 to 500 |
| WT160-10 | AF 418 | Chloride | 0 to 5000 |
| WT180-30 | AF 424 | Hardness, Total | 0 to 500 |
| WT180-40 | AF 423 | Hardness, Yes/No | 4.8 or 20 |
| WT204-20 | AF 431 | Sulphate, (Turbidity) | 0 to 3000 |
| WT208-20 | AF 435 | Sulphite, high range | 0 to 500 |



Minikits

Water Testing

Turbidity Meter, TB211IR

Lovibond®

A compact, infra-red turbidity meter for rapid and precise on-site testing.

- ◆ The unit measures light scatter at 90°, as stated in EN ISO 7027
- ◆ Suitable for measuring in both coloured and colourless liquids
- ◆ Temperature compensated, LED light source operating at 860nm wavelength
- ◆ Real-time clock and date
- ◆ On-board memory of 16 data sets
- ◆ Micro USB data output for results
- ◆ Waterproof sample chamber

| | | |
|----------------------------|------------|--|
| <i>Ranges (resolution)</i> | <i>NTU</i> | 0.01 to 9.99 (0.01) 0.0 to 99.9 (0.1) 100 to 1100 (1) |
| <i>Accuracy</i> | | ±2.5% of reading or ±0.01 NTU (up to 500NTU) ±5% of reading (rest of range) |
| <i>Calibration points</i> | <i>NTU</i> | <0.1, 20, 200, 800 |
| <i>Power</i> | | 1 x 9V PP3 battery |
| <i>Output interface</i> | | micro USB |
| <i>Overall, L x W x D</i> | <i>mm</i> | 190 x 110 x 55 |
| <i>Weight</i> | <i>g</i> | 400 |

Turbidity Meter, Lovibond TB211IR

As described. Supplied with turbidity standards (<0.1, 20, 200 and 800NTU), sample vials, Micro USB output and cable, 9V battery and instructions.

WT400-11 TB211IR

Accessories and Spares

WT403-05 Turbidity standards set, T-CAL

WT403-07 Sample vials, pack of 12

BL610-25 Battery, 9V (1 required)



WT400 in use

Water Testing

Drinking Water Kits

Lovibond®

Drinking Water Kit

For the analysis of: Free and Combined Chlorine, pH, Fluoride, Hardness and Colour.

Ranges:

| | |
|----------|------------------------------------|
| Chlorine | 0.05 to 4.0mg/l as Cl ₂ |
| pH | 6.0 to 8.4 |
| Hardness | 0 to 600mg/l as CaCO ₃ |
| Fluoride | 0 to 1.6mg/l as F |
| Hazen | 10 to 90 units (A.P.H.A.) |

WT500-10 Kit AF357

Free & Combined Chlorine Kits

For analysing the free residual and combined chlorine level in water using DPD reagent tablets.

Range: 0.1 to 1.0mg/l Chlorine (Cl₂)

WT510-10 Kit AF112A

pH and Chlorine Kits

For Free, Combined and Total Chlorine, as well as pH analysis.

Ranges:

Free, Combined and Total Chlorine: 0.1 to 1.0mg/l as Cl₂. pH: 6.8 to 8.4

WT516-12 Kit AF116A

Aluminium Kit

For control of aluminium levels following coagulation and filter backwash operations in treatment plants.

Range: 0 to 0.5mg/l Al

WT530-10 Kit AF157

Sodium Hypochlorite Kit

Provides a rapid and accurate means of analysing the strength of sodium hypochlorite solutions.

Range: 2% to 16% w/w.

WT560-10 Kit AF139

Replacement Reagents

| | Title | Code | Quantity |
|-----------------|---------------------------------------|--------|-------------|
| WT960-15 | Acidifying General Purpose | 515481 | 250 tablets |
| WT960-25 | Alkalinity M | 51532 | 250 tablets |
| WT960-30 | Alkalinity P | 51510 | 250 tablets |
| CS180-11 | Ammonia combi Nos. 1 & 2 | 517612 | 250 tablets |
| WT962-12 | BDH Universal | 45177 | 25ml |
| WT962-15 | BDH 4080 | 45178 | 25ml |
| WT964-10 | Chlorine (High Range) | 51300 | 250 tablets |
| WT964-34 | Copper combi Nos. 1 and 2 | 517692 | 250 tablets |
| WT964-35 | Copper No. 1 | 51355 | 250 tablets |
| WT964-38 | Copper No. 2 | 51356 | 250 tablets |
| WT964-41 | Cyanuric acid | 51132 | 100 tablets |
| CS181-10 | DPD No. 1 (Comparator) | 51106 | 100 tablets |
| CS181-11 | DPD No. 1 (Comparator) | 51161 | 250 tablets |
| CS181-14 | DPD No. 3 (Comparator) | 51108 | 100 tablets |
| CS181-15 | DPD No. 3 (Comparator) | 51181 | 250 tablets |
| CS181-16 | DPD No. 4 (Comparator) | 51122 | 100 tablets |
| CS181-30 | DPD No. 1 (Nessleriser) | 51123 | 100 tablets |
| CS181-34 | DPD No. 3 (Nessleriser) | 51125 | 100 tablets |
| WT966-55 | DPD No. 1 (Rapid Dissolving) | 51131 | 250 tablets |
| WT966-58 | DPD Nitrite | 50269 | 250 tablets |
| WT966-64 | DPD Glycine | 502171 | 250 tablets |
| WT966-80 | EDTA | 51239 | 250 tablets |
| WT968-12 | Excess Aluminium | 51141 | 250 tablets |
| WT970-50 | Iron LR | 51537 | 250 tablets |
| WT970-55 | Iron HR | 51538 | 250 tablets |
| WT972-16 | Nitrate combi Nos. 1 and 2 | 517642 | 250 tablets |
| WT972-35 | Nitrate test | 51281 | 100 tablets |
| WT972-40 | Nitrite Low range | 51231 | 250 tablets |
| WT972-45 | Nitrite Acidifying | 51237 | 250 tablets |
| WT972-55 | Phenol Red pH | 51177 | 100 tablets |
| CS181-55 | Chlorine combi KI and acidifying G.P. | 517722 | 250 tablets |
| CS184-22 | Phenol Red | 51175 | 100 tablets |
| WT976-18 | Sulphate (Turbidity) | 51545 | 250 tablets |



WT500



WT510



WT516



Foil Packed tablets

По вопросам продаж и поддержки обращайтесь:

| | | | |
|-----------------------------|---------------------------------|--------------------------------|---------------------------|
| Алматы (7273)495-231 | Казань (843)206-01-48 | Новокузнецк (3843)20-46-81 | Смоленск (4812)29-41-54 |
| Архангельск (8182)63-90-72 | Калининград (4012)72-03-81 | Новосибирск (383)227-86-73 | Сочи (862)225-72-31 |
| Астрахань (8512)99-46-04 | Калуга (4842)92-23-67 | Омск (3812)21-46-40 | Ставрополь (8652)20-65-13 |
| Барнаул (3852)73-04-60 | Кемерово (3842)65-04-62 | Орел (4862)44-53-42 | Сургут (3462)77-98-35 |
| Белгород (4722)40-23-64 | Киров (8332)68-02-04 | Оренбург (3532)37-68-04 | Тверь (4822)63-31-35 |
| Брянск (4832)59-03-52 | Краснодар (861)203-40-90 | Пенза (8412)22-31-16 | Томск (3822)98-41-53 |
| Владивосток (423)249-28-31 | Красноярск (391)204-63-61 | Пермь (342)205-81-47 | Тула (4872)74-02-29 |
| Волгоград (844)278-03-48 | Курск (4712)77-13-04 | Ростов-на-Дону (863)308-18-15 | Тюмень (3452)66-21-18 |
| Вологда (8172)26-41-59 | Липецк (4742)52-20-81 | Рязань (4912)46-61-64 | Ульяновск (8422)24-23-59 |
| Воронеж (473)204-51-73 | Магнитогорск (3519)55-03-13 | Самара (846)206-03-16 | Уфа (347)229-48-12 |
| Екатеринбург (343)384-55-89 | Москва (495)268-04-70 | Санкт-Петербург (812)309-46-40 | Хабаровск (4212)92-98-04 |
| Иваново (4932)77-34-06 | Мурманск (8152)59-64-93 | Саратов (845)249-38-78 | Челябинск (351)202-03-61 |
| Ижевск (3412)26-03-58 | Набережные Челны (8552)20-53-41 | Севастополь (8692)22-31-93 | Череповец (8202)49-02-64 |
| Иркутск (395)279-98-46 | Нижний Новгород (831)429-08-12 | Симферополь (3652)67-13-56 | Ярославль (4852)69-52-93 |
| Россия (495)268-04-70 | Киргизия (996)312-96-26-47 | Казахстан (7172)727-132 | |

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