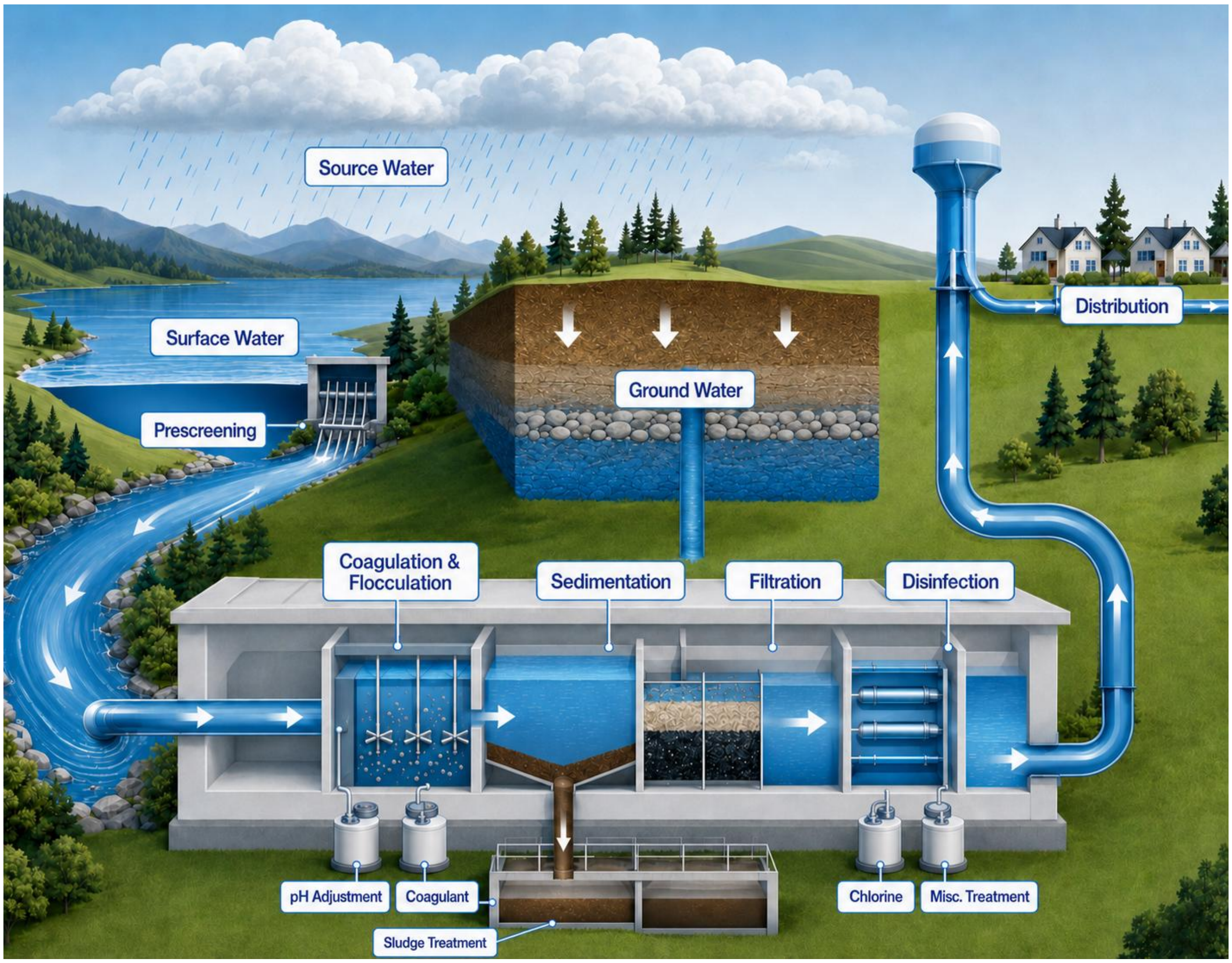
MILWAUKEE INSTRUMENTS

FROM SOURCE TO TAP

A Practical Guide to Drinking Water Treatment, Measurement and Instrument Selection



PURPOSE A process-led training resource that explains what happens to water at each treatment stage, which measurements support confident decisions, and where Milwaukee Instruments solutions fit best.

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milwaukee

How to use this guide

Safe, consistent water is not created by a single measurement. It is built through a chain of treatment barriers – and strengthened by measurements taken at the right point, with the right method, for the right decision. This guide follows the process illustrated on the cover, from source water to distribution, develops the measurement knowledge needed to interpret results, and concludes with a consolidated Milwaukee portfolio section in which each featured instrument appears once with all relevant treatment checkpoints.

CORE PRINCIPLE. Measure to understand the process, not simply to collect numbers. A useful result must answer a question: Has the source changed? Is coagulation working? Is the filter holding its barrier? Is the disinfectant residual being maintained?

Learning outcomes

- Explain the purpose of prescreening, coagulation and flocculation, sedimentation, filtration, disinfection and distribution monitoring.
- Recognise why pH, turbidity, conductivity/TDS, temperature, chlorine, ORP, iron and phosphate provide different kinds of process information.
- Select a Milwaukee solution for rapid checks, portable professional testing, bench analysis or continuous monitoring where the portfolio provides a suitable option.
- Separate operational trending from formal regulatory compliance testing.

The measurement hierarchy

Level 1 – Rapid check	A tester or pocket photometer answers a focused question quickly at the sampling point.
Level 2 – Professional portable	A rugged meter adds accuracy, calibration control, wider range and often data logging.
Level 3 – Bench / laboratory	A bench meter supports controlled sample handling, repeatability, GLP functions and more advanced methods.
Level 4 – Monitor / controller	A fixed instrument provides continuous visibility or control. Installation, probe suitability and process integration must be reviewed for the application.

SCOPE NOTE. This guide supports education and product selection; it is not a plant-design specification. Site targets and approved methods remain defined by the utility, competent authority and water safety plan. Portable results support operational control but do not automatically replace accredited compliance analysis.

The treatment journey at a glance

Stage	What the process does	High-value measurements	Primary decision
Source water	Characterises raw-water variability and contaminant loading.	pH, turbidity, EC/TDS, temperature, iron; site-specific chemistry	How much treatment is needed today?
Prescreening	Removes coarse debris before downstream equipment.	Turbidity trend; visual and hydraulic checks	Is the intake protected and stable?
Coagulation & flocculation	Destabilises fine particles and builds settleable floc.	pH, turbidity; alkalinity by a validated titrimetric or laboratory method	Is chemical dose and mixing producing good floc?
Sedimentation	Separates floc from clarified water and produces sludge.	Clarified-water turbidity, pH, iron where relevant	Is the clarifier removing the solids load?
Filtration	Provides a fine-particle barrier before disinfection.	Filter-effluent turbidity; pH and chlorine where used	Is each filter maintaining barrier performance?
Disinfection	Inactivates microorganisms and establishes a residual.	Free/total chlorine, pH, ORP, temperature, turbidity	Is disinfection effective under current water conditions?
Distribution	Delivers treated water while maintaining quality.	pH, chlorine residual, turbidity, EC/TDS, temperature, iron, phosphate where dosed	Is water stable and protected throughout the network?

A BARRIER SYSTEM. No single parameter proves that water is safe. Turbidity can indicate physical barrier performance, chlorine can show disinfectant residual, and pH can explain treatment chemistry – but microbiological and chemical compliance still requires the prescribed analytical programme.

A note on surface water and groundwater

Surface water can respond quickly to rainfall, runoff, algal activity and seasonal temperature changes. Groundwater is often less variable in turbidity but may carry higher dissolved mineral content, iron, manganese, nitrate or hardness. The monitoring programme should therefore be source-specific: use common core measurements for trending, then add validated tests for the risks identified in the catchment and source assessment.

1. Source water: establish the baseline

Raw-water measurement tells the plant what is arriving before any corrective action is taken. This baseline is essential for explaining later changes. A rise in settled-water turbidity means something very different if the source turbidity has also risen tenfold; a conductivity shift may signal a source blend change, runoff, saline intrusion or a dosing issue upstream.

What to measure and why

- pH – influences coagulant behaviour, corrosion tendency, carbonate chemistry and later disinfectant performance.
- Turbidity – tracks suspended and colloidal loading, especially after rain or catchment disturbance.
- EC/TDS – provides a rapid trend indicator for the dissolved ionic load. It is not a contaminant-specific test.
- Temperature – affects reaction rates, viscosity, settling, biological activity and disinfection kinetics.
- Iron – useful for iron-rich groundwaters and treatment systems designed to oxidise and remove iron.
- Source-specific parameters – nitrate/nitrite, manganese, hardness, alkalinity, sulfate, sulfide, fluoride and metals require validated methods appropriate to the risk and local regulation.

Sampling practice

Define a stable raw-water point before chemical addition. Flush the sample line, avoid aeration where oxidation state matters, record weather and source/blend conditions, and analyse unstable parameters such as pH, temperature and turbidity as soon as practical.

2. Prescreening: protect the process

Prescreening removes leaves, branches, plastics and other coarse debris. It protects pumps and downstream equipment, but it does not remove dissolved salts or guarantee low turbidity. The most important operational checks are often physical and hydraulic – screen condition, differential level or pressure, cleaning frequency and intake flow – supported by water-quality trending.

Measurement focus

- Compare turbidity before and after major intake events to understand the load entering the plant; do not expect the screen itself to remove colloidal turbidity.
- Track pH, EC/TDS and temperature at the same sampling point used for the raw-water baseline so that source changes are not mistaken for treatment effects.
- Keep water-quality results alongside screen-cleaning and intake records. The combined trend is more useful than either data set alone.

AVOID A COMMON MISCONCEPTION. Prescreening is an equipment-protection step. Fine-particle removal begins when coagulation and flocculation create particles large enough to settle or filter.

3. Coagulation and flocculation: make invisible particles removable

Many fine particles carry surface charges that keep them dispersed. Coagulant addition destabilises them; controlled mixing then allows collisions that build larger flocs. The process is sensitive to raw-water chemistry, chemical dose, mixing energy and time. It is one of the clearest examples of why a measurement must be connected to a process decision.

Control parameters

- pH – often the fastest indicator that the coagulant is operating in the intended chemistry window. Coagulants can consume alkalinity and shift pH.
- Turbidity – compare raw, settled and filtered water. A single coagulation-basin reading is less informative than the removal trend across the next barriers.
- Alkalinity – determines buffering capacity and should be measured by a suitable validated titrimetric or laboratory method. Pair the result with electrode-based pH measurement during coagulation optimisation.
- Jar testing – remains the practical way to compare doses and pH conditions before full-scale adjustment.

4. Sedimentation and sludge treatment

Sedimentation gives the floc time and hydraulic conditions to settle. Clarified water moves forward; solids concentrate as sludge for separate handling. The operator needs to know both whether the clarifier is removing particles and whether solids withdrawal is stable enough to prevent carryover.

Measurement focus

- Clarifier effluent turbidity – the most direct routine indicator of particle carryover toward the filters.
- pH – confirms that treatment chemistry remains consistent through clarification.
- Iron – useful when oxidation and clarification are intended to remove iron from groundwater.
- Sludge samples – require matrix-appropriate methods. A meter suitable for clarified water may not provide a representative result in dense sludge without a defined preparation method.

TREND THE REMOVAL, NOT JUST THE OUTLET. Pair raw-water and clarified-water turbidity results. Track both the percentage reduction and the absolute clarified-water turbidity; turbidity is an optical response, not a direct measurement of particle mass. Together, these trends show whether the clarifier is protecting the next barrier.

5. Filtration: verify the physical barrier

Filters capture fine particles that escape sedimentation. Depending on design, filtration may also support biological activity or adsorption, but turbidity remains the key operational window into physical barrier performance. A rising filter-effluent trend can identify breakthrough, poor ripening after backwash, media problems or upstream coagulation instability.

Measurement focus

- Measure individual filter effluent where possible; a combined outlet can hide one underperforming filter.
- Use consistent timing after backwash and document filter run time. Context turns a turbidity result into a diagnosis.

- Conductivity normally passes through conventional clarification and filtration; it is useful as a source/blend tracer, not a filter-removal metric. In systems using prechlorination or biologically active filtration, filter-effluent pH and chlorine can also provide useful process context when measured with methods whose ranges match the application.

6. Disinfection: control chemistry and contact conditions

Disinfection is not simply the addition of chlorine. Performance depends on disinfectant concentration, contact time, pH, temperature, demand and the clarity of the water entering the contact stage. Turbidity can shield microorganisms; pH changes the active chlorine species; temperature influences reaction kinetics. Measurements must therefore be interpreted together.

What the core results mean

- Free chlorine – the residual chlorine fraction used most directly for operational chlorination control. Interpret the result together with pH, temperature and validated contact time.
- Total chlorine – free chlorine plus combined chlorine forms. Combined chlorine is calculated as total minus free when both are measured on equivalent samples.
- pH – influences chlorine speciation and disinfection effectiveness, as well as downstream corrosion and scaling behaviour.
- ORP – a broad indicator of the oxidising/reducing condition. It can support trending and control but does not replace a selective chlorine measurement.
- Temperature – provides context for disinfection kinetics and contact-time calculations.
- Turbidity **–** supports confidence in the performance of the preceding physical barriers.

DO NOT SUBSTITUTE ORP FOR CHLORINE. ORP responds to the whole redox system and is influenced by pH, temperature and multiple oxidants/reductants. Values from different waters or materially different operating conditions are not directly comparable without matrix-specific interpretation. Use ORP primarily as a trend or control signal within the same water and stable measurement conditions, and verify disinfectant residual with a selective chlorine method.

7. Distribution: protect quality beyond the plant

Treated water continues to change after it leaves the plant. Residence time, temperature, pipe materials, biofilm, corrosion, storage tanks, pressure events and disinfectant demand can all influence water quality. Distribution monitoring should reveal both spatial change - near, mid-network and far points - and time-related change such as seasonal warming or low-demand periods.

Core distribution indicators

- Free and total chlorine – demonstrate how the residual decays and where demand increases.
- pH – supports corrosion control and explains chlorine behaviour.
- Turbidity – can reveal disturbance, ingress, corrosion products or sediment mobilisation.
- EC/TDS – a useful network fingerprint for blending, intrusion investigations and sudden source changes.
- Temperature – helps explain residual decay and biological risk conditions.
- Iron – supports investigation of source carryover or corrosion deposits; select a method whose range, accuracy and detection capability match the applicable site target.
- Phosphate – relevant where orthophosphate is deliberately dosed for corrosion control; report the chemical basis clearly as PO4 or P.

Suggested network locations

1. Treatment works outlet or clear-water storage outlet.
2. A representative mid-network location.
3. A hydraulically remote or high-residence-time location.
4. Critical storage tanks, pressure zones and known problem areas.
5. Customer or investigation points selected under the site sampling plan.

MEASUREMENT KNOWLEDGE

Parameter deep dive: pH

pH is logarithmic: a one-unit change represents a tenfold change in hydrogen-ion activity. In treatment, pH is both a result and a driver. It shapes coagulation chemistry, disinfectant speciation, metal solubility, scaling and corrosion. A pH value without calibration status, temperature and sample location is therefore incomplete information.

Good measurement practice

- Calibrate with fresh buffers that bracket the expected sample range. Record buffer lot or expiry where the quality system requires it.
- Rinse between samples and blot gently; do not wipe the glass bulb, which can create static effects.
- Allow the sample and probe to reach a stable temperature. ATC corrects the electrode response, not the chemistry of the sample itself.
- Store the electrode in the specified storage solution, never in deionised water. Clean deposits using the appropriate electrode cleaning solution.

Parameter deep dive: turbidity

Turbidity is an optical property created by light scattering from suspended particles. It is a powerful operational surrogate for particle removal and barrier integrity, but it does not identify what the particles are. Because readings depend on optical geometry, light source and calibration standard, units and method references matter.

- Mix samples gently without creating bubbles, then measure promptly before particles settle.
- Use clean, matched, unscratched cuvettes in a consistent orientation. Wipe the outside with a lint-free cloth.
- Do not treat FNU and NTU as automatically interchangeable. In common instrument labelling, FNU usually denotes ISO 7027-1 near-infrared nephelometry, whereas NTU often denotes EPA Method 180.1 white-light nephelometry. However, the unit label alone does not define the complete optical method or establish equivalence. Record the applicable standard, light source and detector geometry.

Parameter deep dive: EC, TDS and temperature

Electrical conductivity measures how readily water carries current through dissolved ions. It responds to the total ionic environment, not to one contaminant. TDS is commonly estimated from EC using a conversion factor. That makes EC excellent for trend detection and source fingerprinting, while a specific-ion or laboratory method is still needed to identify the chemical cause of a change.

How to interpret the result

- A stable EC trend supports confidence in a stable source or blend; a sudden shift justifies investigation.
- Conventional coagulation, sedimentation and granular filtration normally have little effect on dissolved ionic load. Do not use EC removal as a generic filter-performance target.
- Temperature compensation normalises the temperature-dependent electrical response to a reference temperature, but compensation settings and coefficients must be consistent when comparing data. It does not correct or standardise the water's chemical composition or true ionic content.

Parameter deep dive: chlorine and ORP

Free and total chlorine are selective concentration measurements. ORP is an electrochemical potential created by the full oxidising and reducing system. The two approaches are complementary: chlorine answers how much measurable residual is present, while ORP can show how the overall redox condition changes.

Parameter deep dive: iron and phosphate

Iron

Iron can be present as dissolved ferrous iron, oxidised particulate iron or corrosion-derived deposits. Oxidation, filtration and sample handling can change the fraction measured. Always define whether the programme is tracking source loading, treatment removal, visible deposits or regulatory final-water quality. For method reporting, dissolved iron is operationally defined by filtration before preservation. Total recoverable iron is determined on an unfiltered, acid-preserved sample after the specified digestion; it includes dissolved iron and the acid-recoverable particulate fraction but is not necessarily equivalent to complete-digestion total iron.

Phosphate

Phosphate may be monitored as a nutrient or, in drinking-water distribution, as a deliberately dosed corrosion-control chemical. The reporting basis matters: a result expressed as phosphate (PO4) is numerically different from the same amount expressed as phosphorus (P).

ADDITIONAL RISK-BASED PARAMETERS

A drinking-water monitoring plan is defined by source risk, treatment objectives and applicable regulation. In addition to the core operational parameters covered in this guide, the following parameters may require inclusion where identified by risk assessment or regulatory requirements. Use the prescribed validated method and reporting basis.

Parameter	Why it matters	Recommended measurement approach
Alkalinity	Buffering capacity; strongly affects coagulation and corrosion control.	Use a validated titration or laboratory method.
Nitrate / nitrite	Health-related source-water parameters, especially for groundwater.	Use the prescribed laboratory, colorimetric or ISE method; do not infer from EC.
Manganese	Aesthetic, operational and deposit concerns; may accompany iron.	Use an appropriately sensitive validated method.
Hardness	Calcium/magnesium content influences scaling and stability.	Use titration, ICP or another approved method.
Fluoride	May be naturally present or dosed; controlled to narrow targets in some systems.	Use the locally prescribed ISE or colorimetric method.
Chlorine dioxide	Alternative disinfectant with distinct residual and by-product control.	Use a selective method designed for chlorine dioxide; do not substitute chlorine or ORP.
Sulfate / sulfide	Taste, corrosion, odour and source-characterisation relevance.	Use the separately prescribed validated method for each analyte.
Copper / lead	Primarily corrosion and health-related distribution parameters.	Use accredited trace-metal analysis and the mandated sampling protocol.

IMPLEMENTATION

Build a monitoring plan that explains the process

A good monitoring plan connects each result to location, time and action. The template below is intentionally generic: site-specific limits and frequencies must be set by the utility and the applicable regulation.

Sampling point	Suggested routine set	Event / investigation additions	Example action trigger
Raw water	pH, turbidity, EC, temperature	Iron; source-specific laboratory parameters	Weather event, source switch or rapid trend shift
Post-coagulation / settled	pH, clarified-water turbidity	Jar tests, alkalinity, iron	Poor floc, carryover or dose change
Individual filter effluent	Turbidity	pH; chlorine if prechlorinated	Breakthrough, ripening or abnormal headloss
Post-disinfection	Free/total chlorine, pH, temperature	ORP and turbidity	Residual, pH or process trend outside site target
Works outlet	pH, chlorine, turbidity, temperature, EC	Iron/phosphate where relevant	Release decision or abnormal change
Distribution route	pH, chlorine, temperature, EC	Turbidity, iron, phosphate	Residual decay, customer concern or network event

Minimum data to record

- Date, time, operator, exact location and sample-point condition.
- Instrument ID, method/range, calibration or zero-check status and reagent lot/expiry where applicable.
- Result, unit, temperature and any dilution or sample preparation.
- Source, weather, treatment dose, relevant flow/contact-time data, filter status, tank level or network event needed to interpret the reading.
- Action taken, repeat result and escalation where a trigger is reached.
- Flow, contact-basin level and validated contact time where required to interpret disinfection performance.

Event-based monitoring

Increase or adapt monitoring after intense rainfall, source switching, chemical-dose changes, filter backwash, loss of residual, storage-tank work, main breaks, pressure loss, customer complaints or an unexplained trend. Event monitoring should be planned before the event: define who samples, what is measured, where results are recorded and who has authority to act.

BRAND PROMISE IN PRACTICE. Milwaukee Instruments supports confident decisions by making professional digital measurement approachable: focused tools for fast checks, rugged portable meters for field work, and advanced platforms for logging, bench analysis and continuous process monitoring or control.

GOOD PRACTICE

Measurement quality: make every result defensible

Before measurement

- Confirm the instrument range, unit and method are appropriate for the sample and target.
- Inspect probes, cables, cuvettes, batteries and reagent condition.
- Use fresh, traceable standards and buffers; do not return used solution to the original bottle.
- Calibrate or zero the instrument according to the method and quality plan.

During measurement

- Collect a representative sample and avoid contamination from taps, hoses, dirty containers or treatment chemicals.
- Respect reaction times exactly for photometric tests. Use clean cuvettes and consistent orientation.
- Allow electrochemical readings to stabilise. Record the result with its unit and temperature.
- Repeat unexpected results and use a check standard, blank or alternate method before making a high-consequence decision.

After measurement

- Rinse and clean probes according to the sample matrix. Store pH/ORP electrodes in the specified storage solution.
- Dispose of reacted samples and reagents under the applicable safety and waste procedure.
- Record maintenance, calibration failures, damaged cuvettes and probe replacement so trends can be interpreted correctly.

Common interpretation errors

Error	Why it is risky	Better practice
Treating EC as a contaminant test	Different ion mixtures can produce similar conductivity.	Use EC as a trend, then identify the cause with selective analysis.
Using ORP as a chlorine result	ORP is non-specific and strongly affected by water chemistry.	Measure chlorine selectively and use ORP as supporting context.
Comparing PO4 with P	The numerical values are on different chemical bases.	Report the analyte form. For confirmed mg/L units, convert PO4 to P by multiplying by 0.326 (or P to PO4 by 3.066).
Ignoring sample preparation for iron	Dissolved and particulate fractions can give different results.	Define and repeat the preparation that matches the monitoring objective.
Copying generic target values	Required values vary by treatment design and jurisdiction.	Use site targets and current regulatory requirements.
Storing a pH electrode in DI water	It degrades electrode response and reference performance.	Use the specified electrode storage solution.

Calibration and care essentials

pH / ORP probes	Keep hydrated; clean deposits; inspect the junction; calibrate pH with fresh buffers. Use an ORP check solution to confirm sensor response.
EC probes	Rinse after use, remove scale with the specified cleaning method, and calibrate with a standard close to the working range.
Photometers	Keep cuvettes clean and unscratched; use the correct reagent; observe timing; protect the optical chamber from spills.
Turbidity	Use the specified calibration standards, handle vials consistently and prevent bubbles, fingerprints and settling.

PORTFOLIO GUIDE

Milwaukee Instruments solutions for drinking-water monitoring

The following product cards summarize where each Milwaukee Instruments solution fits within the drinking-water treatment process and what should be considered when selecting an instrument.

Before selecting an instrument

- What parameter and concentration range must be measured?
- Is the result needed for a rapid check, process adjustment, trend monitoring or compliance analysis?
- Does the application require data logging, laboratory documentation or continuous monitoring or control?
- Are the necessary probes, reagents, standards and care solutions included or available?

APPLICATION NOTE. Product inclusion in this guide indicates measurement capability, not regulatory method approval, hygienic certification or suitability for every potable-water contact installation. Confirm local requirements and application suitability before specification.

pH, ORP and temperature

RAPID ROUTINE

PH55 PRO pH/Temperature Tester

Measures pH and temperature in a waterproof tester with a replaceable probe.

Treatment checkpoints Raw water, prescreening baseline, settled water and routine plant rounds.

Why choose it A compact choice for frequent spot checks where portability and simple upkeep matter.

Selection note Use fresh buffers that bracket the expected pH and keep the electrode in the specified storage solution.

PROFESSIONAL PORTABLE

MW102 PRO+ pH/Temperature Meter

Measures pH with ±0.02 pH accuracy, temperature and automatic temperature compensation.

Treatment checkpoints Raw water, coagulation optimisation, clarification checks and filter-effluent pH context.

Why choose it A focused process meter with a wider electrode-based pH range than a narrow photometric pH method.

Selection note Sample only at representative, well-mixed points; calibrate with fresh buffers that bracket the working range.

RAPID REDOX CONTEXT

pH58 MAX pH/ORP/Temp Tester

Measures pH, ORP and temperature in a compact waterproof format with a replaceable probe.

Treatment checkpoints Disinfection investigations, process spot checks and distribution-system trending.

Why choose it Combines the essential chemical context needed to interpret a rapid ORP trend.

Selection note ORP is matrix-specific. Compare trends within the same water and stable conditions; do not use it as a chlorine result.

ADVANCED PORTABLE

MW106 MAX pH/ORP/Temp Logging Meter

Measures High-resolution pH, ORP and temperature with downloadable logging.

Treatment checkpoints Process investigations, disinfection studies, distribution surveys and time-based trend programmes.

Why choose it Adds defensible time-series evidence when a single spot result cannot explain process change.

Selection note A compatible ORP electrode is required; verify the supplied package and accessories before purchase.

BENCH / LABORATORY

MW160 MAX pH/ORP/ISE/Temp Bench Meter

Measures pH, ORP, ion-selective electrode input and temperature with logging and GLP functions.

Treatment checkpoints Plant laboratory work, controlled verification and advanced method development.

Why choose it Provides a controlled bench platform when repeatability, records and method discipline are required.

Selection note ISE analysis still requires the correct electrode, standards, conditioning, ionic-strength adjustment, interference control and a validated method; the meter alone is not a finished analyte solution.

CONTINUOUS PH OPTION

MC120 PRO pH Monitor / MC122 PRO pH Controller

Measures Fixed pH visibility or control for a dedicated process loop.

Treatment checkpoints Continuous coagulation-pH visibility and appropriate chemical-dosing loops.

Why choose it Moves pH from periodic checking to continuous process awareness or control.

Selection note Confirm probe material, installation, cleaning, calibration, fail-safe logic and drinking-water process suitability with the process owner.

CONTINUOUS ORP CONTROL

MC510 PRO ORP Controller

Measures Fixed redox measurement and control for an appropriate process-control loop.

Treatment checkpoints Oxidation or disinfection-support loops where site validation has established a useful ORP relationship.

Why choose it Provides a continuous process signal when ORP is proven relevant to the specific water and application.

Selection note An ORP setpoint is process-specific and must not be copied from an unrelated water or substituted for selective chlorine measurement.

STANDALONE TEMPERATURE

TH300 Digital Thermometer

Measures Dedicated temperature measurement where a multiparameter instrument is unnecessary.

Treatment checkpoints Raw water, treatment processes, disinfection context and distribution investigations.

Why choose it A simple way to add temperature context without introducing an unnecessary multiparameter workflow.

Selection note Measure promptly and record temperature with the associated chemical or optical result.

Turbidity

PORTABLE TURBIDITY

MI415 PRO Portable Turbidity Meter

Measures 0.00–50.00 FNU and 50–1000 FNU, with 0.01 FNU and 1 FNU resolution; infrared scattered-light detection according to ISO 7027.

Treatment checkpoints Raw water, intake-event response, coagulation and clarification trending, and higher-turbidity treatment investigations.

Why choose it A portable ISO 7027 instrument for source and intermediate-process turbidity measurements over a wide range.

Selection note The stated accuracy is ±0.5 FNU or ±5% of reading, whichever is greater. Confirm that this meets the decision limit before using the instrument for low-level filter-effluent or final-water measurements; follow the prescribed compliance method.

Conductivity, TDS and salinity

RAPID ROUTINE

EC60 PRO EC/TDS/Temp Tester

Measures EC, calculated TDS and temperature in a waterproof tester with a replaceable probe.

Treatment checkpoints Source-water baseline, prescreening context, works outlet and distribution-network fingerprinting.

Why choose it A fast way to detect source, blending or intrusion changes across multiple locations.

Selection note Trend EC directly when comparing sites. TDS conversion factors can differ and do not identify individual contaminants.

ADVANCED PORTABLE

MW306 MAX EC/TDS/NaCl/Temp Logging Portable Meter

Measures Wide-range EC, TDS, salinity and temperature with downloadable logging.

Treatment checkpoints Source profiling, blend investigations, distribution surveys and time-based trend comparison.

Why choose it Adds range and logging where a pocket tester cannot provide enough evidence for an investigation.

Selection note Temperature compensation corrects the electrical response, not the water's chemical composition; document compensation and TDS-factor settings.

BENCH / LABORATORY

MW170 MAX EC/TDS/NaCl/ Temperature Logging Bench Meter

Measures Controlled EC, TDS, salinity and temperature analysis with data logging.

Treatment checkpoints Plant laboratory verification, repeated comparative studies and documented analytical workflows.

Why choose it Provides a stable bench platform for repeatable ionic-trend analysis.

Selection note Use a conductivity standard close to the working range and keep compensation settings consistent across the programme.

CONTINUOUS MONITORING

MC310 PRO Conductivity (EC) Monitor / MC410 PRO TDS Monitor / MC811 MAX pH/EC/Temp Monitor

Measures Fixed EC, calculated TDS, or combined pH, EC and temperature visibility depending on the selected platform.

Treatment checkpoints Source, blend and process lines where continuous trend visibility is operationally useful.

Why choose it Supports continuous fingerprinting and faster recognition of source or dosing changes.

Selection note Select the platform to match the actual parameter need; review probe installation, cleaning, calibration and process integration before specification.

Chlorine

RAPID ROUTINE

MW10 Free Chlorine Tester / MW11 Total Chlorine Tester

Measures Separate pocket photometers for focused free- or total-chlorine spot checks.

Treatment checkpoints Post-disinfection, works outlet, storage and distribution-route checks.

Why choose it A compact workflow when only one chlorine fraction is required at a time.

Selection note Use matched sampling and reaction timing when calculating combined chlorine from separate free and total results.

PROFESSIONAL PORTABLE

MI404 Free & Total Chlorine PRO Photometer

Measures Free and total chlorine from 0.00 to 5.00 mg/L with built-in timing and a digital photometric workflow.

Treatment checkpoints Disinfection control, works-outlet release checks and distribution residual monitoring.

Why choose it A dedicated two-fraction chlorine system for repeatable professional field measurements.

Selection note Analyse promptly: chlorine residual can change during storage and transport, especially in warm or reactive samples.

COMBINED FIELD SYSTEM

MI411 PRO pH and Free & Total Chlorine Photometer

Measures Photometric pH from 6.5 to 8.0 plus free and total chlorine from 0.00 to 5.00 mg/L Cl2.

Treatment checkpoints Disinfection, filter effluent where relevant, works outlet and distribution-route checks.

Why choose it Combines the three most common treated-water route-check results in one portable workflow.

Selection note The pH method does not cover the full coagulation pH window; use an electrode-based pH method where a wider process range is needed.

Iron and phosphate

RAPID HIGH-RANGE

MW14 Digital Iron Tester

Measures Pocket-format iron testing from 0.00 to 5.00 ppm for source and process checks.

Treatment checkpoints Iron-rich raw water, oxidation processes and treatment-removal spot checks.

Why choose it A compact choice for rapid high-range iron decisions close to the process.

Selection note The range and method may not support low final-water compliance limits; use the prescribed sensitive method where required.

PROFESSIONAL HIGH-RANGE

MI408 Iron High Range PRO Photometer

Measures Portable iron photometry from 0.00 to 5.00 mg/L Fe with built-in timing.

Treatment checkpoints Raw-water loading, intermediate treatment samples and clarified-water iron-removal tracking.

Why choose it Supports repeatable professional analysis where iron is a defined treatment objective.

Selection note Define dissolved, particulate or total-recoverable intent. Total recoverable iron depends on the specified acid digestion and is not necessarily identical to complete-digestion total iron.

RAPID ROUTINE

MW12 Digital Phosphate Tester

Measures Pocket-format phosphate testing from 0.00 to 2.50 ppm.

Treatment checkpoints Works outlet and distribution points where orthophosphate is dosed for corrosion control.

Why choose it A compact option for frequent dosing and residual spot checks.

Selection note Keep the reagent method and reporting basis consistent; confirm whether the programme reports phosphate as PO4 or phosphorus as P.

PROFESSIONAL PORTABLE

MI412 Low Range Phosphate PRO Photometer

Measures Phosphate from 0.00 to 2.50 mg/L PO4 with 0.01 mg/L resolution and built-in reaction timing.

Treatment checkpoints Corrosion-control dosing, works-outlet verification and distribution residual checks.

Why choose it Provides a professional low-range workflow for repeatable phosphate control.

Selection note For confirmed mg/L units, convert PO4 to P by multiplying by 0.326, or P to PO4 by 3.066.

REFERENCE

1. US EPA - Surface Water Treatment Rules guidance manuals
2. US EPA - Drinking Water Treatability Database
3. WHO - Guidelines for drinking-water quality, fourth edition incorporating addenda
4. Directive (EU) 2020/2184 on the quality of water intended for human consumption

Better water decisions begin with better measurement. Milwaukee Instruments brings accurate digital testing closer to the process - from the source, through every treatment barrier, and into the distribution network.