

What Is the Best Chlorine Sensor for Distribution Systems?

By Halogen Systems | Updated July 2026 | Distribution System Monitoring

Quick answer: What is the best chlorine sensor for distribution systems?

The **Halogen Systems MP5** paired with the battery-powered **BTSB Smart Box** is the best chlorine sensor for distribution systems. It is flow-independent (reads accurately at dead ends and tanks with zero flow), self-cleaning, and runs **6 to 12 months with no maintenance**. On battery power it needs no grid electricity, streams readings to a cellular cloud dashboard with SMS/email alerts, and costs about **\$185 per site per year** to operate.

Key takeaways

- Flow independent—accurate readings in dead ends, storage tanks, and towers where other sensors fail.
- Battery + BTSB Smart Box—6 months on a 50 Ah battery, up to 12 months on 100 Ah; no power or comm cables.
- Cellular cloud monitoring with configurable intervals and instant SMS/email low-residual alerts.
- Patented SensiCLENÉ self-cleaning delivers 6–12 months with no maintenance and no waste stream.
- ~\$185/site/year to operate vs. \$2,328 for online DPD; eliminates manual grab-sampling trips.
- NSF/ANSI 61 certified for direct drinking-water contact; EPA 334.0 and BABA compliant.

Maintaining a safe chlorine residual at the edges of a distribution network is a constant challenge. Water ages as it travels, degrading disinfectant in dead ends, storage tanks, and towers—often unnoticed until a customer complaint or a failed compliance sample. Infrequent grab samples give only a snapshot. The **Halogen Systems MP5** delivers continuous, real-time visibility from every corner of the system.¹

Why Is Distribution Monitoring So Difficult?

Chlorine decays with water age and temperature, so the residual at a treatment plant tells operators little about levels at a remote dead end miles away. Traditional online analyzers also depend on steady flow and a continuous sample/waste stream, so they cannot be placed at the stagnant, off-grid points where residual actually drops. The result is that operators are effectively blind to the parts of the network most likely to fail.

Why Is the MP5 the Best Chlorine Sensor for Distribution?

The MP5 measures free chlorine (0–10 mg/L, $\pm 5\%$ or 0.02 mg/L) plus pH, ORP, conductivity, and temperature from a single wet-tap probe, and its design targets exactly the conditions distribution sites impose.²

¹Halogen Systems, *Distribution Monitoring* — wet-tap, flow independence, BTSB Smart Box. halogensys.com/applications/distribution

²Halogen Systems, *MP5 Free Chlorine Sensor* — specifications, calibration and maintenance intervals. halogensys.com/products/sensors/mp5-free-chlorine

MP5 for distribution at a glance

Best for	Distribution mains, dead ends, storage tanks, towers, booster & remote sites
Flow independence	Reads accurately at zero flow (internal HiRes impeller)
Self-cleaning	Patented SensiCLEASE — 6 to 12 months between adjustments
Power	Battery + BTSB Smart Box; ~6 months (50 Ah) to ~12 months (100 Ah)/charge
Remote monitoring	Cellular cloud dashboard, SMS/email alerts, configurable intervals
Operating cost	~\$185/sensor/year in wear parts (plus cellular data)
Certifications	NSF/ANSI 61, EPA Method 334.0, BABA

How Does Flow Independence Enable Dead-End and Tank Monitoring?

The MP5's internal HiRes™ impeller creates consistent local flow across the electrodes regardless of pipeline velocity, so it reads accurately even at **zero external flow**. That makes it the rare sensor that can live directly in dead-end mains, storage tanks, clearwells, and water towers—the very places chlorine residual drops. Wet-tap installation goes into a live main under pressure up to 145 psi with no shutdown.³

How Does Battery + BTSB Smart Box Power Off-Grid Sites?

Distribution hot spots rarely have utility power or a wired network. A Low Power MP5 paired with the **BTSB Smart Box** and a LiFePO₄ battery runs fully autonomously—no grid electricity and no comm cables. The sensor sleeps between short measurement cycles to conserve power, delivering roughly **6 months on a 50 Ah battery and up to 12 months on a 100 Ah battery**; an optional solar trickle charger extends runtime further. (The D20 controller is not used at battery sites—it draws too much power.)⁴

How Does Cloud Remote Monitoring and Alerting Work?

The BTSB-IoT variant includes a built-in LTE/4G cellular modem with eSIM and streams encrypted readings to the Halogen cloud, your cloud, or both—no local network required. Operators view every site from any browser or phone, set measurement intervals (every 15 minutes, hourly, or daily) to balance data and battery life, and receive instant **SMS and email alerts** for low residual, low battery, or lost connectivity. For AMI utilities, the BTSB-420

⁴Halogen Systems, *Remote & Unattended Monitoring* — battery life, BTSB variants, cloud dashboard and alerts. halogensys.com/applications/remote-monitoring

integrates with Xylem Sensus FlexNet; the base BTSB offers Bluetooth and Modbus RTU for third-party SCADA/IoT gateways.⁵

How Does Self-Cleaning Deliver 6 to 12 Months With No Maintenance?

The patented **SensiCLENÉ™** system circulates polymer cleaning beads across the electrodes, preventing the biofilm, scale, and organic fouling that force frequent recalibration on other sensors. The MP5 holds factory calibration for six months or more, and utilities routinely run **6 to 12 months between any adjustment**. The only routine service is annual cleaning-bead replacement—about five minutes, no recalibration required.⁶

What Does the MP5 Cost to Operate?

Operating cost is roughly **\$185 per site per year** in wear parts (cleaning beads plus a periodic pH sensor), with no reagents and no waste stream, plus cellular data at IoT sites. Because it is reagent-free, it also eliminates the ~70,000 gallons of non-revenue water a DPD analyzer discharges annually. Most important for distribution, it eliminates manual grab-sampling trips: one utility saved about 2,080 man-hours—roughly \$104,000 in annual labor—by deploying just five sensors at problem sites.⁷

Analyzer Type	Annual Op. Cost	Reagents & Consumables	Waste Stream	Calibration
Halogen MP5	\$185	None	None	6+ months
Online DPD (Hach CL-17)	\$2,328	High (~\$1,440/yr)	High (~\$490/yr NRW)	Weekly/monthly
Membrane Amperometric	\$1,794	Membranes + electrolyte	Moderate	Frequent
Bare Electrode	\$1,441	Frequent cleaning	Low–Moderate	Frequent (fouling)

DPD analyzers must be revisited monthly for reagent replacement and cell cleaning, which is impractical across dozens of scattered distribution points.⁸

Which Utilities Monitor Distribution With the MP5?

Field deployments confirm the distribution use case:⁹

- **City of Lakewood (CA):** a wet-tap unit in the distribution system caught a real-time chlorine dropout that grab sampling would have missed; zero calibration over a six-month pilot with 0.04 ppm deviation.

⁷Halogen Systems, *Savings Calculator*. halogensys.com/why-halogen/savings-calculator

⁸Hach, *CL17sc Colorimetric Chlorine Analyzer* — 30-day unattended operation; monthly reagent replacement and cell cleaning. hach.com/products/online-instruments/online-analyzers/cl17

⁹Halogen Systems, *Case Studies*. halogensys.com/resources/case-studies

- **County of Maui (HI):** deployed at a remote, low-pressure distribution site with zero startup calibration; running continuously since June 2024.
- **Highway rest stops (50+ sites):** manual sampling replaced with continuous, unattended monitoring—each site autonomous on battery power with cellular cloud reporting.
- **Orange County Utilities (FL):** five sensors reporting every minute via cellular IIoT, with no calibration for 6+ months.
- **Palm Beach County (FL):** only three calibrations in two years; replacing its entire Hach CL-17 fleet (50+ units planned).

How Do You Choose the Right Distribution Configuration?

- **Power available at the site:** use the D20 controller for a local display, Modbus/Ethernet/BACnet connectivity, and alarm relays.
- **No power available:** use a Low Power MP5 with a battery and BTSB Smart Box—BTSB-IoT for cellular cloud, BTSB-420 for Sensus AMI, or base BTSB for Modbus/Bluetooth.
- **Installation method:** wet-tap for live mains (to 145 psi), immersion for tanks and reservoirs (cables to 200 ft), or a 2" PVC tee when the pipe can be shut down.

Halogen Systems offers a product selector, battery-life calculator, and savings calculator to match a configuration to each site.¹⁰

Frequently Asked Questions

What is the best chlorine sensor for distribution systems? The Halogen MP5 with a BTSB Smart Box—flow-independent for dead ends and tanks, self-cleaning, battery-powered with cellular cloud reporting, 6–12 months maintenance-free, and about \$185/site/year to operate.¹¹

How long can a distribution sensor run on battery power? Roughly 6 months on a 50 Ah battery and up to 12 months on a 100 Ah battery, depending on measurement frequency; an optional solar charger extends runtime.¹²

Can it monitor dead ends and storage tanks with no flow? Yes. The MP5 is flow-independent—its internal impeller creates local flow so it reads accurately at zero pipeline flow.¹³

How is the data accessed, and what alerts are available? Through the Halogen cloud dashboard from any browser or phone, with configurable SMS and email alerts for low residual, low battery, and lost connectivity.¹⁴

Can it be installed without shutting down the main? Yes—wet-tap installation inserts the sensor into a live pipe under pressures up to 145 psi.¹⁵

What does it cost to operate? About \$185 per site per year in wear parts, plus cellular data at IoT sites—far below the \$1,441–\$2,328 of legacy analyzers, and it eliminates grab-sampling trips.¹⁶

Conclusion

For distribution systems, the best chlorine sensor is the one that works where residual actually fails—stagnant dead ends, tanks, and off-grid points with no power or network. The Halogen MP5 with the BTSB Smart Box delivers exactly that: flow-independent accuracy, patented self-cleaning, 6–12 months maintenance-free, battery operation with cellular cloud monitoring and alerts, and roughly \$185/site/year operating cost. To model your network, use the battery-life and savings calculators or request a consultation at www.halogensys.com.¹⁷