

**DOMESTIC HOT WATER - LEGIONELLA COMPLIANCE**  
**PERFORMANCE SPECIFICATION - COPPER SILVER IONIZATION**

**1. GENERAL:**

**1.1 SCOPE & ENGINEERING REQUIREMENTS:**

Medical or commercial-grade copper-silver ionization (CSI) water disinfection system is required to achieve Legionella compliance across one or more domestic hot water (DHW) zones within the facility's network, potentially involving multiple solutions to address varying system needs.

- A. **APPLICATION:** DHW LEGIONELLA COMPLIANCE / GROWTH PREVENTION
- B. **NUMBER OF WATER ZONES:** SEE SCHEDULE
- C. **ZONE LOCATION(S):** SEE SCHEDULE & SHOP DRAWINGS

**1.2 DEFINITIONS:**

- A. **MANUFACTURERS:** Entity responsible for designing, producing, and assembling CSI technology systems, ensuring compliance with industry standards, durability, and performance for Legionella control in potable water applications.
- B. **BRAND:** A unique identity, symbol, name, design, or combination thereof that distinguishes a product, service, or organization from its competitors. A brand represents the perception, reputation, and value associated with an entity, shaped by consumer experiences, marketing, and quality.
- C. **VENDORS:** A supplier of CSI technology systems, responsible for sales, distribution, and optionally offering service contracts for installation, maintenance, and system support.
- D. **VDC:** Volts of Direct Current. / **VAC:** Volts of Alternate Current.
- E. **TCP/IP:** Transmission Control Protocol (TCP) supporting the Internet Protocol (IP) Suite.
- F. **DHW:** Domestic Hot Water
- G. **DHW Zone:** A designated area where hot water makers are assigned to a single, isolated DHW loop that operates independently without mixing with other DHW zones.
- H. **PLC:** Programmable Logic Controller / **HMI:** Human Machine Interface
- I. **IPS:** Iron Pipe Size / **CTS:** Copper Tube Size
- J. **Disinfection:** Legionella bacterial reduction and/or growth control.

**1.3 APPLICABLE CODES AND STANDARDS:**

- A. **CSA Z317.1:** Special Requirements for Plumbing Installations in Health care Facilities, **CSA C22.2 No. 14** Industrial Control Equipment
- B. **NSF/ANSI 61:** Drinking Water System Components - Health Effects
- C. **NSF/ANSI 372:** Drinking Water System Components - Lead Content

#### 1.4 SUBMITTALS:

- A. **Equipment Data:** Submit a completed "Equipment Data Sheet" as part of the documentation.
- B. **Shop Drawings:** Include drawings indicating size, profiles, and dimensional requirements of copper silver ion controller(s) and cell(s) based on the specific system/configuration required (See Schedule). Also provide power requirement(s) and output specification(s), and plumbing diagram(s) for piping systems.
- C. **Operation and Maintenance Documentation:** Supply comprehensive manuals for system operation and maintenance.
- D. **Warranty Documentation:** Include full details of all warranties provided with the equipment for the CSI controller(s) and ionization chamber cell(s).
- E. **Service Proposal:** Vendor to provide optional maintenance service agreement outlining terms and conditions.
- F. **Finance Options:** Vendor to provide capital cost (and/or) 5 or 10 year lease option.
- G. **Data Logging and Reporting Access:** Provide the web address for accessing system data logs and reports. Include a temporary username and password to verify the application's functionality.
- H. **Reference Installations:** Submit at least 10 comparable Canadian installations completed within the last five years, including the project ID, facility description, CSI model numbers installed, commissioning date, technology parameters, capacity, and photographs of the installations.
- I. **Liability Insurance:** Provide a valid liability insurance certificate with coverage of at least \$5 million (CAD) applicable in Canada.
- J. **System Certification:** Submit a signed declaration or documentation confirming that the CSI disinfection system is specifically designed for installation in facility potable water systems to prevent Legionella bacterial growth.
- K. **Manufacturing Certification:** Provide documentation that the copper-silver ionization technology has been manufactured in Canada or the USA.
- L. **Operational Safety Backups:** The system must include redundant ionization backup features.

#### 1.5 QUALITY ASSURANCE

- A. **Product Options:** Include any drawings indicating size, profiles, and dimensional requirements of copper silver ion generators based on the specific system/configuration indicated.

## 1.6 WARRANTY

- A. 10 Years limited warranty on the controller(s) and 1-year pro-rated warranty on the ionization chamber cell(s). The manufacturer will include standard form in which manufacturer agrees to repair or replace components of copper silver system that fail in materials or workmanship within specified warranty period.
- B. Type of Failure: Include types of failures.
- C. Warranty Period by component: From date of substantial completion.

## 1.7 SERVICE PROPOSAL (OPTIONAL)

- A. Vendor to provide optional maintenance programs for the system.  
Program can include:
  - 1. Semi-annual inspections of the system, including operating functions.
  - 2. Monthly water sample testing of the recirculating domestic hot water for copper and comparison against the as-constructed baseline results,
  - 3. Chamber cell replacement program (on a unit cost basis)

# PART 2 - CSI PRODUCTS

## 2.1 CSI STANDARD OF ACCEPTANCE / BRANDS:

Compliant CSI Brands / Must be manufactured in North America.

### BRANDS (MADE IN CANADA): PREFERRED

- CSIPhoenix® - 2025 NEXT-GEN TECH / CSIPHOENIX.COM / 1-888-988-4667
- CSIDefender® - LEGACY TECH
- AQUALYSE® - LEGACY TECH

## 2.2 COPPER-SILVER IONIZATION WATER TREATMENT SOLUTION COMPONENTS:

### A: IONIZATION CONTROLLER(S)/PLC: (SEE SCHEDULE FOR POWER REQUIREMENTS)

1. The CSI equipment will include a software based industrial grade PLC with correct software ionization version and features for the application.
2. The CSI equipment will operate properly over the identified range of water hardness and/or TDS as indicated in the schedule. (SEE SCHEDULE)
3. "Single-Zone" or "Multi-Zone" CSI Controller(s) for all DHW Zone location(s) as to provide independent ionization application and monitoring reliability.
4. Controller(s) must be able to generate, via amperage set points and automated variable voltage, between 0.2 - 0.4 ppm (Cu) and 0.02 - 0.04 ppm (Ag) within the DHW loop over existing pre-start-up water values.
5. Controller to include a 10-year limited warranty.
6. Facility power source requirements:  
(SEE SCHEDULE FOR AMPERAGE REQUIREMENTS)
7. Controller DC Power Drives: 0 to 120 VDC (Minimum)  
computer-controlled ionization variable power drives for each ionization chamber cell.
8. DC Drive to provide output amperage set-point capacity of 10A constant current for each chamber cell and capable of being altered based manufacturer performance recommended values.
9. Include multiple independently controlled DC Drives to lower startup cost and relative technology footprint when applicable. (SEE SCHEDULE)
10. Include an integrated, automated ion delivery redundancy feature designed to maintain uninterrupted system function in the event of a single chamber or drive fault. System shall auto switch to a backup cell or auto-compensate by redistributing power across the connected backup or remaining active chamber cells without compromising minimum required ionization output levels.
11. Include individual panel mounted electrical safety circuit breakers for each active ionization chamber cells and PLC.
12. Include a minimum of 2 user profile type access accounts. (General User & Administrator) with access log data.
13. Include profile based, password protected, user accounts with access log data. (See Section B for data logging requirements)
14. Controller must include automated reverse polarity ionization switching to provide even depletion of the internal electrodes and limit scaling.

15. Include panel door mounted controller status indicator LED.
16. Include a minimum of three (3) application status volt-free (dry) contacts for universal BMS interface. (Run, Maintenance Required, Fault). BMS provider to connect the appropriate contacts.
17. Include wired (and/or wireless) TCP HMI access with optional BACNet connectivity for critical values when required. (Bluetooth, Internet, VPN and another connectivity provided by owner if required)
18. Include automated ionization proportional-control and water composition monitoring features.

**B: DATA LOGGING AND USER ACCESS:**

1. The CSI system shall include a dedicated data logging module capable of recording all critical activities and system states in real time, including but not limited to:
  - Ionization activity (e.g., amperage, voltage, and ion output),
  - Maintenance-related activity (scheduled and unscheduled),
  - All operational warnings and fault codes,
  - User login attempts and system interactions.
2. All logged events shall be time-stamped and exportable in a standard file format (e.g., CSV or equivalent) for off-site archiving, compliance reporting, and administrative audit review.
3. The system shall support no fewer than ten (10) password-protected user access accounts.
4. Each user account shall include the following identification fields: Full Name, Position/Title, Email Address, Phone Number
5. The system shall include at least three (3) distinct access levels: General User, Supervisor, Administrator
6. Each level must control access to specific features based on operational responsibility.
7. The system shall log all user activity, including login/logout times, system setting changes, alarm acknowledgments, and manual overrides, with timestamped attribution to the responsible user.
8. Data logs shall be viewable locally through the controller's HMI and optionally accessible via remote methods provided by the facility.
9. Remote access capability may include TCP/IP, VPN, or other methods supported by the facility's IT infrastructure, provided the owner supplies a dedicated IP address, subnet

mask, and gateway address to allow secure network integration.

**C: IONIZATION CHAMBER CELL(S) : (SEE SCHEDULE FOR PROJECT REQUIREMENTS)**

1. Flow Body to be constructed of either: A: Schedule 40 (316) stainless steel (or) B: Resin coated aluminum (or) C: Schedule 80 CPVC.
2. Include electrode erosion protection: To prevent premature electrode depletion and extend the lifespan of consumables when installed in a DHW loop.
3. Include internal laminar flow water turbulence prevention: Prevents accelerated sedimentation and lowers the preventative maintenance frequency.
4. Include exterior wire harness safety cover to prevent tampering and/or accidental disconnections.
5. Include 300V rated water resistant quick release electrical connectors with rubber gasket.
6. Include cut grooved couplings (or flanged) connections for easy installation and removal without being affected by high water temperatures or pressures.
7. Multiple chamber cells must be installed in parallel to prevent ionic re-deposition.
8. Chamber cell(s) to be installed vertically and at a height of between 36.0" and 66.0" from the floor to facilitate installation, removal and periodical maintenance.
9. Chamber cell(s) to be installed at no more than 6 meters (20 feet) from the CSI controller(s) for optimal VDC connections.
10. Chamber cells to be installed using grooved couplings with gaskets or flanges. Chamber cell(s) to be electrically isolated from grounded plumbing.
11. Provide enough active chamber cells (and alloy) to accommodate the load and DHW return line without significant drop in pressure (SEE SCHEDULE FOR REQUIRED NUMBER OF CELLS)
12. Provide electrode alloy MSDS composition for purity and lack of trace elements. Provide proof that the electrodes are safe for human consumption when used in portable water environments.
13. Provide NSF/ANSI61 AND NSF/ANSI 372 documentation on all wetted parts as to meet all safety requirements associated to potable water intended for human consumption.
14. CSI alloy ratio will be as per the recommended blend by the manufacturer: Acceptable ratios are: 90Cu/10Ag, 80Cu/20Ag or 70Cu/30Ag.

**C: DIGITAL FIELD WATER TEST KIT**

15. Provide a digital display water testing colorimeter for on-site copper testing and controller calibration.

**PART 3 - Quality Control & Data Logging / Reporting**

**3.1 QUALITY CONTROL (Mandatory)**

Provide a post-commissioning report signed by the manufacturing company.

**3.2 ACTIVITY DATA LOGGING & REPORTING**

- A. Provide on-line access to input / output (reporting) of: Water sample data logging accessible by registered end users and/or a group of authorized users via a secured internet SSL connection. All data input variables will be identified by input date and data submission origin (username). Water data collection and reporting variable will include but not limited to: locations, times, multiple copper values, water temperatures, comment area, and any other necessary type of variable associated to the technology used.

**3.3 PREVENTATIVE MAINTENANCE DATA LOGGING & REPORTING (MANDATORY)**

- A. Provide on-line access to input / output (reporting) and scheduled preventative maintenance data logging accessible by registered end users and/or a group of authorized users via a secured internet SSL connection. All data input variables will be identified by input date and data submission origin (username) and will include data entry items required such as: type of maintenance, location, site name, technology model number, mechanical room location, service tech name, and any other necessary type of variable associated to the technology used.

**PART 4 - EXECUTION**

**4.1 IMPLEMENTATION (MANDATORY)**

- A. Describe implementation process.

**4.2 CONNECTIONS (MANDATORY)**

- A. Piping installation requirements: Include digital shop drawings to indicate general arrangement of piping, fittings, and specialties if any.
- B. Install piping adjacent to equipment to allow service and maintenance.

#### 4.3 FIELD QUALITY CONTROL (MANDATORY)

- A. Manufacturer's Field Service: Engage a factory certified service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field-testing. Report results in writing via commissioning report within 30 days after commissioning.
- B. Perform the following field tests and inspections and prepare test reports:
  - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation.
  - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Remove and replace malfunctioning copper silver ion generators that do not pass tests and inspections, and retest as specified above.

#### 4.4 STARTUP & ON-GOING SERVICE (MANDATORY)

- A. Engage a factory certified service representative to perform startup service. Complete installation and startup checks in accordance with manufacturer's written instructions.
- B. On-Site or Remote Technology Commissioning, Startup & Calibration.
- C. Prepare post-commissioning report for sign-off by Owner or Owner representative.
- D. On-going monthly service maintenance is required. (*Maintenance can be provided by FM*)

#### 4.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain copper silver ion generators. (On-Site or Virtual)

\*\*\*END\*\*\*