

EXCLUSIVE FEATURES OF **BORIN® Stelth® Solid-State Reference Electrodes**

Each BORIN® Stelth® solid-state reference electrode is manufactured in our 20,000 square foot state-of-the-art factory. In addition, every reference electrode is shipped with a factory calibration/test certificate identified by a bar code that contains all of the historical information for each reference electrode.

Our manufacturing procedures include the following tests:

- Continuity of wire
- Continuity of wire insulation
- Resistance of lead wire and sensing element connection (has to be a dead short)
- Internal resistance of the BORIN® Stelth® reference electrode (lowest of any reference electrode on the market – insuring a significant reduction in IR drop)
- Calibration of reference electrodes are done at 25° Celsius
- Final test is for response time from activation to stable reading without hysteresis.

BORIN® Stelth® solid-state reference electrodes also feature:

Moisture Retention Membrane MRM™

The single largest enemy of sulfate-based reference electrodes (copper and zinc) are chlorides. More reference electrodes are destroyed by chloride contamination than any other factor. The first line of defense for those using BORIN® Stelth® solid-state reference electrodes is the Moisture Retention Membrane (MRM™) which traps chloride ions as they make contact with the membrane. The MRM™ traps moisture, which is critical in dry soil conditions, as well as prevents contaminated ground water from entering the reference electrode.

Chloride Ion Trapping Chemistry (Membrane Impregnated)

First, we impregnate a trapping material into the ceramic sensing element of the copper-copper sulfate and zinc-zinc sulfate BORIN® Stelth® reference electrode that traps chloride, chlorine, and bromide ions before they reach the chemistry inside.

Hydrogen Sulfide Ion Trapping Chemistry (Integral to Electrolyte)

Second, we employ ion trapping chemistry that removes hydrogen sulfide ions that penetrate into the internal chemistry of ALL Stelth® reference electrodes before these ions can damage the electrode, up to 1000 parts per million.

Solid-State Technology That Never Need Recharging

BORIN® Stelth® reference electrodes are made with a completely solid-state technology that never requires recharging, cleaning or servicing of any kind.

NOTE ABOUT CHLORIDES, BROMIDES, & HYDROCARBONS AND STELTH® REFERENCE ELECTRODES:

Thanks to the chloride ion trapping technology used in the **BORIN® Stelth® copper-copper sulfate and zinc-zinc sulfate reference electrodes**, they are able to withstand chloride, chlorine and bromide levels up to 1000 parts per million, unlike other manufacturer's reference electrodes.

BORIN® Stelth® Silver-silver chloride reference electrodes are ideally suited for use with chloride levels between 10,000 parts per million and 27,000 parts per million. Above or below these levels creates a "Liquid Junction Potential".

Chloride, chlorine and bromide levels above 1,000 parts per million can reduce the life of Stelth® copper-copper sulfate and zinc-zinc sulfate reference electrodes, and chloride levels below 10,000 parts per million or in excess of 27,000 parts per million can reduce the life of Stelth® silver-silver chloride reference electrodes.

BORIN's newly-developed **palladium Stelth® reference electrodes** are immune to unlimited concentrations of chloride, chlorine and bromide, and can be utilized in problem zones which have stunted use of traditional chemistries, such as areas with brackish water that have unknown chloride counts. BORIN's palladium-palladium chloride reference electrodes are also hydrocarbon-proof (HCP™), making them ideal for use in locations saturated with hydrocarbons including those contaminated by gasoline, crude oil, brake fluid, transmission fluid, et cetera.

100% Testing of Each BORIN® Stelth® Solid-State Reference Electrode

Each BORIN® Stelth® reference electrode is individually calibrated against a Calomel reference electrode under field conditions. The Stelth® reference electrodes are then tested for internal resistance, continuity, IR-drop, sensitivity, stability, and finally serialized. Certification certificates are provided for each cell to the end user. *This calibration method is impossible to do with the old-fashioned plaster backfilled reference electrodes.* We also offer complimentary calibration services for all of our reference electrodes that you might have previously purchased.

The BORIN® Stelth® Solid-State Reference Electrodes Can Now Be FROZEN

With the development of the Moisture Retention Membrane MRM™, the BORIN® Stelth® reference electrodes can now be used in frozen environments without concern of damaging the cell. Through extensive testing with hundreds of cells in Russia, Sweden, and Alaska, the MRM™ has been proven to eliminate failures from freezing.

AC Mitigation Monitoring Now Available

The **Stelth® 7 IR-Free Solid-State AC Mitigation-Monitoring reference electrodes** feature a third, 1 cm² coupon that acts as a sensing source for AC interference and allows calculations to be made of current density on the structure, therefore learning when AC corrosion is possibly occurring.

A Major Breakthrough – The Hydrocarbon-Proof™ Stelth® That Can Be Used in All Environments

Our **BRAND NEW** Stelth® Hydrocarbon-Proof™ (HCP™) reference electrode has completed extensive field testing is now available. If you have facilities contaminated by gasoline, crude oil, brake fluid, transmission fluid, et cetera and are unable to get a reference cell reading, the Stelth® HCP™ stationary or portable reference electrode will solve your problem. Patent applied for.

BORIN® Stelth 1® Solid-State Reference Electrode for Water and Buried Service

- The BORIN® Stelth® 1 reference electrode is built with special porous ceramic contact plugs allow removal from and re-entry into liquid without damaging the reference electrode. The unit is thus reusable and may be reactivated (after use) for a period of up to one year.
- High-impact resistant plastic reference electrode case will not deteriorate even in highly corrosive environments.
- Minimum 30-year service life.
- Indefinite shelf life, indefinite stability.
- Available in four chemistries and color-coded for quick and easy identification: Pd-PdCl₂ (orange), Cu-CuSO₄ (yellow), Ag-AgCl (blue), Zn-ZnSO₄ (red).
- Technologically-advanced "ion trap" prevents contamination of internal electrolytes.
- Two levels of chloride ion trapping technologies as well as hydrogen sulfide trapping technologies are used in the copper and zinc Stelth® 1 reference electrodes:
 - First, we impregnate a trapping material into the ceramic sensing tube that traps chloride ions before they reach the chemistry of the copper or zinc Stelth® 1.
 - Second, we employ a chloride ion trapping system that removes chloride ions that penetrate the chemistry of the copper or zinc Stelth® 1 before these ions can cause damage.
- **Note:** The Stelth® 1 copper-copper sulfate and zinc-zinc sulfate reference electrodes are stable up to levels of up to 1,000 parts per million chloride plus bromide. The BORIN Stelth® 1 silver-silver chloride reference cells are optimized for a chloride level of 19,000 parts per million (seawater) but can be used in environments with lesser or greater chloride levels. BORIN's newly-developed palladium Stelth® 1 reference electrodes are immune to chloride count issues and can be utilized in problem zones which have stunted use of traditional chemistries, such as areas that have too many parts per million of chlorides for silver reference electrodes.
- Each BORIN® Stelth® 1 Solid-State reference electrode is individually tested, certified, and has a unique serial number, allowing for traceability of any single cell throughout its lifetime.
- Complete installation instructions included.



Size: 1" (25mm) diameter x 8" (203mm) long.

Standard Lead wire: 20' (15m) of #14 (2.5mm²) RHH-RHW wire (any length of wire available).

Material: High-impact ABS, ceramic with moisture retention membrane.

Long Term Stability Range: ±10 millivolts with 10 megaohm load.

Certified Potential Range: ±5 millivolts with 10 megaohm load.

Maximum Continuous Current: 0.3 microamps.

pH Range: 4–9 pH.

Working Temperature Range: 32° F to +176° F (0° C to 80° C).

Material Temperature Range: -60° F to +185° F (-51° C to 85° C).

BORIN® Stelth 1® Solid-State Reference Electrode for Water and Buried Service: Saturated Soil or Submerged Applications

Stelth® 1 – Model SRE-040-HCP

Hydro-Carbon Proof (Pd-PdCl₂)

For water and saturated soil service in *any chloride level* environment.

Stelth® 1 – Model SRE-002-CFY

Copper-Copper Sulfate (Cu-CuSO₄)

For water and saturated soil service in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

Stelth® 1 – Model SRE-004-SFB

Silver-Silver Chloride (Ag-AgCl)

For water and saturated soil service in *chloride* environments.

Stelth® 1 – Model SRE-006-ZFR

Zinc-Zinc Sulfate (Zn-ZnSO₄)

For water and saturated soil service in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

BORIN® Stelth 2® Solid-State Reference Electrode for Buried and Concrete Service



- The Stelth® 2 reference electrode features 32 in² of sensing surface area. This makes electrode positioning less critical to achieve accurate readings.
- Will not dry out in desert soil, a condition that renders other electrodes ineffective. Cyclical variations in soil conditions, ranging from hydrated to dehydrated have no adverse effects on the Stelth® 2 reference electrode.
- BORIN's reference electrodes may be taken out of service for extended periods of time and reintroduced into the system without affecting reference electrode accuracy or ability to reactivate. (Electrode will reactivate in less than five minutes.)
- Minimum 30-year service life.
- Indefinite shelf life, indefinite stability.
- Available in four chemistries and color-coded for quick and easy identification: Pd-PdCl₂ (orange), Cu-CuSO₄ (yellow), Ag-AgCl (blue), Zn-ZnSO₄ (red).
- Technologically-advanced "ion trap" prevents contamination of internal electrolytes.
- Two levels of chloride ion trapping technologies are used in the Stelth® 2 reference electrode:
 - First, we impregnate a trapping material into the ceramic sensing tube that traps chloride ions before they reach the chemistry of the Stelth® 2.
 - Second, we employ a chloride ion trapping system that removes chloride ions that penetrate the chemistry of the Stelth® 2 before these ions can cause damage.
- **Note:** The Stelth® 2 cu-cuSO₄ and zinc-zinc sulfate reference electrodes are stable up to levels of up to 1,000 parts per million chloride plus bromide. The BORIN Stelth® 2 silver-silver chloride reference cells are optimized for a chloride level of 19,000 parts per million (seawater) but can be used in environments with lesser or greater chloride levels, but with reduced life. BORIN's newly-developed palladium Stelth® 2 reference electrodes are immune to chloride count issues and can be utilized in problem zones which have stunted use of traditional chemistries, such as areas that have too many parts per million of chlorides for silver reference electrodes.
- Each BORIN® Stelth® 2 Solid-State reference electrode is individually tested, certified, and has a unique serial number, allowing for traceability of any single cell throughout its lifetime.
- Complete installation instructions included.

Size: 1.5" (40 mm) diameter x 7" (180 mm) long.

Standard Lead Wire: 20' (15 m) of #14 (2.5 mm²) RHH-RHW wire (any length of wire available).

Material: Ceramic with moisture retention membrane.

Long Term Stability Range: ±10 millivolts with 10 megaohm load.

Certified Potential Range: ±5 millivolts with 10 megaohm load.

Maximum Continuous Current: 0.3 microamps.

pH Range: 4–9 pH.

Working Temperature Range: 32° F to +176° F (0° C to 80° C).

Material Temperature Range: -60° F to +185° F (-51° C to 85° C).

BORIN® Stelth® 2 Solid-State Reference Electrode for Buried and Concrete Service

Stelth® 2 – Model SRE-041-HCP

Hydro-Carbon Proof (Pd-PdCl₂)

For direct burial and concrete in *any chloride* environment.

Stelth® 2 – Model SRE-007-CFY

Copper-Copper Sulfate (Cu-CuSO₄)

For direct burial and concrete in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

Stelth® 2 – Model SRE-008-SFB

Silver-Silver Chloride (Ag-AgCl)

For direct burial and concrete in *chloride* environments.

Stelth® 2 – Model SRE-009-ZUR

Zinc-Zinc Sulfate (Zn-ZnSO₄)

For direct burial and concrete in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

BORIN® Stelth® 3 Solid-State Portable Reference Electrodes



- A completely solid-state reference electrode that never requires recharging, cleaning or servicing of any kind.
- High-impact-resistant Lexan® electrode case will not deteriorate even in highly corrosive environments.
- Requires no maintenance of any kind.
- Minimum 10-year service life.
- Indefinite shelf life, indefinite stability.
- Available in four chemistries and color-coded for quick and easy identification: Pd-PdCl₂ (orange), Cu-CuSO₄ (yellow), Ag-AgCl (blue), Zn-ZnSO₄ (red).
- Technologically-advanced "ion trap" prevents contamination of internal electrolytes.
- Two levels of chloride ion trapping technologies are used in the Stelth® 3 reference electrode:
 - First, we impregnate a trapping material into the ceramic sensing tube that traps chloride ions before they reach the chemistry of the Stelth® 3.
 - Second, we employ a chloride ion trapping system that removes chloride ions that penetrate the chemistry of the Stelth® 3 before these ions can cause damage.
- **Note:** The Stelth® 3 cu-cuSO₄ and zinc-zinc sulfate reference electrodes are stable up to levels of up to 1,000 parts per million chloride plus bromide. The BORIN Stelth® 3 silver-silver chloride reference cells are optimized for a chloride level of 19,000 parts per million (seawater) but can be used in environments with lesser or greater chloride levels, but with reduced life. BORIN's newly-developed palladium Stelth® 3 reference electrodes are immune to chloride count issues and can be utilized in problem zones which have stunted use of traditional chemistries, such as areas that have too many parts per million of chlorides for silver reference electrodes.
- Each BORIN® Stelth® 3 Solid-State reference electrode is individually tested, certified, and has a unique serial number, allowing for traceability of any single cell throughout its lifetime.
- Complete installation instructions included.

Size: 1" (25.4mm) diameter x 8" (203 mm) long high-impact non-stick tube.

Material: Lexan® electrode case housing; ceramic tip with moisture retention membrane.

Long Term Stability Range: ±10 millivolts with 10 megaohm load.

Certified Potential Range: ±5 millivolts with 10 megaohm load.

Maximum Continuous Current: 0.3 microamps.

pH Range: 4–9 pH.

Working Temperature Range: 32° F to +176° F (0° C to 80° C).

Material Temperature Range: -60° F to +185° F (-51° C to 85° C).

BORIN® Stelth® 3 Solid-State Portable Reference Electrodes

Stelth® 3 – Model SRE-042-HCP

Hydro-Carbon Proof (Pd-PdCl₂)

Permanent portable water and/or soil applications in *any chloride* environment.

Stelth® 3 – Model SRE-010-CPY

Copper-Copper Sulfate (Cu-CuSO₄)

Permanent portable for water and/or soil in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

Stelth® 3 – Model SRE-011-SPB

Silver-Silver Chloride (Ag-AgCl)

Permanent portable for water and/or soil in *chloride* environments.

Stelth® 3 – Model SRE-012-ZPR

Zinc-Zinc Sulfate (Zn-ZnSO₄)

Permanent portable for water and/or soil in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

BORIN® Stelth® 4 Solid-State Portable Reference Electrode – Fat Cat



- A completely solid-state device that never requires recharging, cleaning or servicing of any kind.
- Large sensing area reduces soil or concrete contact resistance.
- High-impact-resistant plastic electrode case will not deteriorate even in highly corrosive environments.
- Requires no maintenance of any kind.
- Minimum 10-year service life.
- Indefinite shelf life, indefinite stability.
- Available in four chemistries and color-coded for quick and easy identification: Pd-PdCl₂ (orange), Cu-CuSO₄ (yellow), Ag-AgCl (blue), Zn-ZnSO₄ (red).
- Technologically-advanced "ion trap" prevents contamination of internal electrolytes.
- Two levels of chloride ion trapping technologies are used in the Stelth® 4 reference electrode:
 - First, we impregnate a trapping material into the ceramic sensing tube that traps chloride ions before they reach the chemistry of the Stelth® 4.
 - Second, we employ a chloride ion trapping system that removes chloride ions that penetrate the chemistry of the Stelth® 4 before these ions can cause damage.
- **Note:** The Stelth® 4 Cu-CuSO₄ and zinc-zinc sulfate reference electrodes are stable up to levels of up to 1,000 parts per million chloride plus bromide. The BORIN Stelth® 4 silver-silver chloride reference cells are optimized for a chloride level of 19,000 parts per million (seawater) but can be used in environments with lesser or greater chloride levels, but with reduced life. BORIN's newly-developed palladium Stelth® 4 reference electrodes are immune to chloride count issues and can be utilized in problem zones which have stunted use of traditional chemistries, such as areas that have too many parts per million of chlorides for silver reference electrodes.
- Each BORIN® Stelth® 4 Solid-State reference electrode is individually tested, certified, and has a unique serial number, allowing for traceability of any single cell throughout its lifetime.
- Complete installation instructions included.

Size: 2.25" (57mm) diameter x 4" (102mm) long high-impact resistant plastic electrode case.

Material: Lexan® electrode case housing; ceramic tip with moisture retention membrane.

Long Term Stability Range: ±10 millivolts with 10 megaohm load.

Certified Potential Range: ±5 millivolts with 10 megaohm load.

Maximum Continuous Current: 0.3 microamps.

pH Range: 4–9 pH.

Working Temperature Range: 32° F to +176° F (0° C to 80° C).

Material Temperature Range: -60° F to +185° F (-51° C to 85° C).

BORIN® Stelth® 4 Solid-State Portable Reference Electrode – Fat Cat

Stelth® 4 – Model SRE-043-HCP

Hydro-Carbon Proof (Pd-PdCl₂)

Permanent portable with wide sensing area for soil or concrete surfaces in *any chloride* environment.

Stelth® 4 – Model SRE-013-CPY

Copper-Copper Sulfate (Cu-CuSO₄)

Permanent portable with wide sensing area for soil or concrete surfaces in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

Stelth® 4 – Model SRE-014-SPB

Silver-Silver Chloride (Ag-AgCl)

Permanent portable with wide sensing area for soil or concrete surfaces in *chloride* environments.

Stelth® 4 – Model SRE-015-ZPR

Zinc-Zinc Sulfate (Zn-ZnSO₄)

Permanent portable with wide sensing area for soil or concrete surfaces in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

BORIN® Stelth® 5 Solid-State Reference Electrode for Thru-Hull Marine Service



- A completely solid-state reference electrode that never requires recharging, cleaning or servicing of any kind.
- High-impact-resistant plastic electrode case will not deteriorate even in highly corrosive environments.
- Never requires maintenance of any kind.
- Minimum 20 years of service life.
- Indefinite shelf life; indefinite stability.
- Available in four chemistries and color-coded for quick and easy identification: Pd-PdCl₂ (orange), Cu-CuSO₄ (yellow), Ag-AgCl (blue), Zn-ZnSO₄ (red).
- Technologically-advanced "ion trap" prevents contamination of internal electrolytes.
- Two levels of chloride ion trapping technologies are used in the Stelth® 5 reference electrode:
 - First, we impregnate a trapping material into the ceramic sensing tube that traps chloride ions before they reach the chemistry of the Stelth® 5.
 - Second, we employ a chloride ion trapping system that removes chloride ions that penetrate the chemistry of the Stelth® 5 before these ions can cause damage.
- **Note:** The Stelth® 5 cu-cuSO₄ and zinc-zinc sulfate reference electrodes are stable up to levels of up to 1,000 parts per million chloride plus bromide. The BORIN Stelth® 5 silver-silver chloride reference cells are optimized for a chloride level of 19,000 parts per million (seawater) but can be used in environments with lesser or greater chloride levels, but with reduced life. BORIN's newly-developed palladium Stelth® 5 reference electrodes are immune to chloride count issues and can be utilized in problem zones which have stunted use of traditional chemistries, such as areas that have too many parts per million of chlorides for silver reference electrodes.
- Each BORIN® Stelth® 5 Solid-State reference electrode is individually tested, certified, and has a unique serial number, allowing for traceability of any single cell throughout its lifetime.
- Complete operating instructions included.

Material: Lexan® electrode case housing; ceramic tip with moisture retention membrane.

Long Term Stability Range: ±10 millivolts with 10 megaohm load.

Certified Potential Range: ±5 millivolts with 10 megaohm load.

Maximum Continuous Current: 0.3 microamps.

pH Range: 4–9 pH.

Working Temperature Range: 32° F to +176° F (0° C to 80° C).

Material Temperature Range: -60° F to +185° F (-51° C to 85° C).

BORIN® Stelth® 5 Solid-State Reference Electrode for Thru-Hull Marine Service

Stelth® 5 – Model SRE-044-HCP

Hydro-Carbon Proof (Pd-PdCl₂)

For thru-hull marine applications in *any chloride* environment.

Stelth® 5 – Model SRE-016-CMY

Copper-Copper Sulfate (Cu-CuSO₄)

For thru-hull marine applications in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

Stelth® 5 – Model SRE-017-SMB

Silver-Silver Chloride (Ag-AgCl)

For thru-hull marine applications in *chloride* environments.

Stelth® 5 – Model SRE-018-ZMR

Zinc-Zinc Sulfate (Zn-ZnSO₄)

For thru-hull marine applications in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

BORIN® Stelth® 6 Solid-State Reference Electrode for Buried and Concrete Service



- A completely solid-state reference electrode that never requires recharging, cleaning or servicing of any kind.
- High-impact-resistant plastic reference electrode case will not deteriorate even in highly corrosive environments.
- Will not dry out in desert soil, a condition that renders other reference electrodes ineffective. Cyclical variations in soil conditions, ranging from hydrated to dehydrated have no adverse effects on the Stelth® 6 reference electrode.
- Requires no maintenance of any kind.
- This reference electrode may be taken out of service for extended periods of time and reintroduced into the system without affecting the reference electrode's accuracy or ability to reactivate. (The Stelth® 6 reference electrode will reactivate in less than five minutes.)
- Minimum 30 years of service life.
- Indefinite shelf life; indefinite stability.
- Available in four chemistries and color-coded for quick and easy identification: Pd-PdCl₂ (orange), Cu-CuSO₄ (yellow), Ag-AgCl (blue), Zn-ZnSO₄ (red).
- Technologically-advanced chloride "ion trap" prevents chloride contamination of internal electrolytes.
- Two levels of chloride ion trapping technologies are used in the Stelth® 6 reference electrode:
 - First, we impregnate a trapping material into the ceramic sensing tube that traps chloride ions before they reach the chemistry of the Stelth® 6.
 - Second, we employ a chloride ion trapping system that removes chloride ions that penetrate the chemistry of the Stelth® 6 before these ions can cause damage.
- **Note:** The Stelth® 6 cu-cuSO₄ and zinc-zinc sulfate reference electrodes are stable up to levels of up to 1,000 parts per million chloride plus bromide. The BORIN Stelth® 6 silver-silver chloride reference cells are optimized for a chloride level of 19,000 parts per million (seawater) but can be used in environments with lesser or greater chloride levels, but with reduced life. BORIN's newly-developed palladium Stelth® 6 reference electrodes are immune to chloride count issues and can be utilized in problem zones which have stunted use of traditional chemistries, such as areas that have too many parts per million of chlorides for silver reference electrodes.
- Each BORIN® Stelth® 6 Solid-State reference electrode is individually tested, certified, and has a unique serial number, allowing for traceability of any single cell throughout its lifetime.
- Complete operating instructions included.

Standard Lead Wire: 20' (15 m) of #14 (2.5 mm²) RHH-RHW wire.

Material: Ceramic with moisture retention membrane.

Long Term Stability Range: ±10 millivolts with 10 megaohm load.

Certified Potential Range: ±5 millivolts with 10 megaohm load.

Maximum Continuous Current: 0.3 microamps.

pH Range: 4–9 pH.

Working Temperature Range: 32° F to +176° F (0° C to 80° C).

Material Temperature Range: -60° F to +185° F (-51° C to 85° C).

Stelth® 6 Solid State Reference Electrode for Buried and Concrete Service

Stelth® 6 – Model SRE-045-HCP

Hydro-Carbon Proof (Pd-PdCl₂)

For buried and concrete service in *any chloride* environment.

Stelth® 6 – Model SRE-019-CCY

Copper-Copper Sulfate (Cu-CuSO₄)

For buried and concrete service in *low chloride* environments.

Stelth® 6 – Model SRE-020-SCB

Silver-Silver Chloride (Ag-AgCl)

For buried and concrete service in *chloride* environments.

Stelth® 6 – Model SRE-021-ZCR

Zinc-Zinc Sulfate (Zn-ZnSO₄)

For buried and concrete service in *low chloride* environments.

BORIN® Stelth® 7 Solid-State Reference Electrodes

- The **Stelth® 7 IR-Free**, **Stelth® 7 IR-Free Rocket**, and **Stelth® 7 IR-Free AC-Mitigation Monitoring** reference electrodes:
 - Were developed to take IR-Free on-potential and off-potential readings of a structure without having to shut down or to turn off any interference systems (such as your rectifiers) while reading only the single worst potential that exists on that structure.
 - Have a minimum design life of 30 years and an indefinite shelf life.
 - Will maintain a stability of ± 5 millivolts with 10 mega ohms impedance over 30 years.
 - Will operate in all ranges of soil and water conditions, from desert dry soils to flood zones, swamps, sea and fresh water environments.
 - **Eliminate expensive interrupters.** Eliminates the tedious procedure of synchronizing a series of interrupters.
 - **Allows you to take off-potential readings on rectifiers that have high amperage outputs** which are beyond the handling capacity of the interrupters on the market today.
- This technology easily **allows any remote monitoring and control system** (process control system) **to automate the IR-Free on-potential and off-potential readings of a structure.**
- The **Stelth® 7 IR-Free AC-Mitigation Monitoring** reference electrodes feature a **third, 1 cm² coupon** that **acts as a sensing source for AC interference** and which **allows calculation of the current density** on a structure therefore **knowing when AC corrosion is possibly occurring.**
- On-potential and off-potential measurements can now be taken **without consideration for any outside influences** such as **nearby rectifiers, anode beds, electric transmission lines, trains and subways, and steel in concrete.**
- Can be reused and taken out of service as many times as desired.
- Minimum 30 years of service life.
- Indefinite shelf life; indefinite stability.
- Available in four chemistries and color-coded for quick and easy identification: Pd-PdCl₂ (orange), Cu-CuSO₄ (yellow), Ag-AgCl (blue), Zn-ZnSO₄ (red).
- Technologically-advanced "ion trap" prevents contamination of internal electrolytes.
- Two levels of chloride ion trapping technologies are used in the Stelth® 7 reference electrode:
 - First, we impregnate a trapping material into the ceramic sensing tube that traps chloride ions before they reach the chemistry of the Stelth® 7.
 - Second, we employ a chloride ion trapping system that removes chloride ions that penetrate the chemistry of the Stelth® 7 before these ions can cause damage.



- **Note:** The Stelth® 7 cu-cuSO₄ and zinc-zinc sulfate reference electrodes are stable up to levels of up to 1,000 parts per million chloride plus bromide. The BORIN Stelth® 7 silver-silver chloride reference cells are optimized for a chloride level of 19,000 parts per million (seawater) but can be used in environments with lesser or greater chloride levels, but with reduced life. BORIN's newly-developed palladium Stelth® 7 reference electrodes are immune to chloride count issues and can be utilized in problem zones which have stunted use of traditional chemistries, such as areas that have too many parts per million of chlorides for silver reference electrodes.
- Each BORIN® Stelth® 7 Solid-State reference electrode is individually tested, certified, and has a unique serial number, allowing for traceability of any single cell throughout its lifetime.
- Complete operating instructions included.
- Shipping weight is only 3 pounds.
- Built strictly to the DIN Standard 50925 – European and U.S. patents applied for.

Stelth® 7 IR-Free Size: 2.25" (60 mm) diameter x 8.5" (220 mm) long.

Material: High Impact ABS, ceramic with moisture retention membrane.

Long Term Stability Range: ±5 millivolts with 10 megaohm load.

Certified Potential Range: ±5 millivolts with 10 megaohm load.

Maximum Continuous Current: 0.3 microamps.

pH Range: 4–9 pH.

Working Temperature Range: 32° F to +176° F (0° C to 80° C).

Material Temperature Range: -60° F to +185° F (-51° C to 85° C).

Includes: Bullet Box® IR Free Interrupter

BORIN® Stelth® 7 IR-Free Probe 1 cm² Solid-State Reference Electrode

Stelth® 7 – Model SRE-046-HCP

Hydro-Carbon Proof (Pd-PdCl₂)

IR-Free probe with 1 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *any chloride* environment.

Stelth® 7 – Model SRE-022-CIY

Copper-Copper Sulfate (Cu-CuSO₄)

IR-Free probe with 1 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

Stelth® 7 – Model SRE-025-SIB

Silver-Silver Chloride (Ag-AgCl)

IR-Free probe with 1 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *chloride* environments.

Stelth® 7 – Model SRE-028-ZIR

Zinc-Zinc Sulfate (Zn-ZnSO₄)

IR-Free probe with 1 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

BORIN® Stelth® 7 IR-Free Probe 10 cm² Solid-State Reference Electrode

Stelth® 7 – Model SRE-047-HCP

Hydro-Carbon Proof (Pd-PdCl₂)

IR-Free probe with 10 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *any chloride* environment.

Stelth® 7 – Model SRE-023-CIY

Copper-Copper Sulfate (Cu-CuSO₄)

IR-Free probe with 10 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

Stelth® 7 – Model SRE-026-SIB

Silver-Silver Chloride (Ag-AgCl)

IR-Free probe with 10 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *chloride* environments.

Stelth® 7 – Model SRE-029-ZIR

Zinc-Zinc Sulfate (Zn-ZnSO₄)

IR-Free probe with 10 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

BORIN® Stelth® 7 IR-Free Probe 5 cm² + 5 cm² Solid-State Reference Electrode

Stelth® 7 – Model SRE-048-HCP

Hydro-Carbon Proof (Pd-PdCl₂)

IR-Free probe with 5 cm²+5 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *any chloride* environment.

Stelth® 7 – Model SRE-024-CIY

Copper-Copper Sulfate (Cu-CuSO₄)

IR-Free probe with 5 cm²+5 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

Stelth® 7 – Model SRE-027-SIB

Silver-Silver Chloride (Ag-AgCl)

IR-Free probe with 5 cm²+5 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *chloride* environments.

Stelth® 7 – Model SRE-030-ZIR

Zinc-Zinc Sulfate (Zn-ZnSO₄)

IR-Free probe with 5 cm²+5 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

BORIN® Stelth® 7 Rocket – IR Free 100 cm² Probe Solid State Reference Electrode

Stelth® 7 – Rocket Model SRE-049-HCP

Hydro-Carbon Proof (Pd-PdCl₂)

IR-Free probe with 100 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *any chloride* environment.

Stelth® 7 – Rocket Model SRE-031-CSY

Copper-Copper Sulfate (Cu-CuSO₄)

IR-Free probe with 100 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

Stelth® 7 – Rocket Model SRE-032-SSB

Silver-Silver Chloride (Ag-AgCl)

IR-Free probe with 100 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *chloride* environments.

Stelth® 7 – Rocket Model SRE-033-ZSR

Zinc-Zinc Sulfate (Zn-ZnSO₄)

IR-Free probe with 100 cm² coupon and Bullet Box interrupter providing ON & OFF potentials, 100mV shift, and current readings in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

BORIN® Stelth® 7 IR-Free 10 cm² AC Mitigation Monitoring Solid-State Reference Electrode

Stelth® 7 IR-Free 10 cm² AC Mitigation Monitoring – Model SRE-048-HCP-AC20

Hydro-Carbon Proof (Pd-PdCl₂)

IR-Free probe with 10 cm² coupon in *any chloride* environment.

Stelth® 7 IR-Free 10 cm² AC Mitigation Monitoring – Model SRE-024-CIY-AC20

Copper-Copper Sulfate (Cu-CuSO₄)

IR-Free probe with 10 cm² coupon in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

Stelth® 7 IR-Free 10 cm² AC Mitigation Monitoring – Model SRE-027-SIB-AC20

Silver-Silver Chloride (Ag-AgCl)

IR-Free probe with 10 cm² coupon in *chloride* environments.

Stelth® 7 IR-Free 10 cm² AC Mitigation Monitoring – Model SRE-030-ZIR-AC20

Zinc-Zinc Sulfate (Zn-ZnSO₄)

IR-Free probe with 10 cm² coupon in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

BORIN Stelth 7 IR-Free 100 cm² AC Mitigation Monitoring Solid-State Reference Electrode

Stelth® 7 IR-Free 100 cm² AC Mitigation Monitoring – Model SRE-049-HCP-AC200

Hydro-Carbon Proof (Pd-PdCl₂)

IR-Free probe with 100 cm² coupon in *any chloride* environment.

Stelth® 7 IR-Free 100 cm² AC Mitigation Monitoring – Model SRE-031-CSY-AC200

Copper-Copper Sulfate (Cu-CuSO₄)

IR-Free probe with 100 cm² coupon in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

Stelth® 7 IR-Free 100 cm² AC Mitigation Monitoring – Model SRE-032-SSB-AC200

Silver-Silver Chloride (Ag-AgCl)

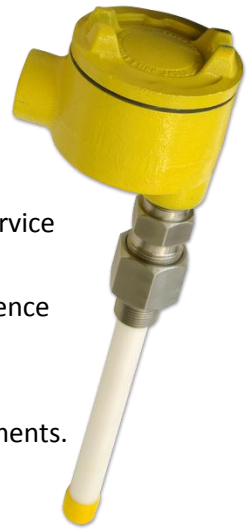
IR-Free probe with 100 cm² coupon in *chloride* environments.

Stelth® 7 IR-Free 100 cm² AC Mitigation Monitoring – Model SRE-033-ZSR-AC200

Zinc-Zinc Sulfate (Zn-ZnSO₄)

IR-Free probe with 100 cm² coupon in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

BORIN® Stelth® 8 Solid-State Reference Electrode for Thru-Hull Tanks



- The Stelth® 8 thru-hull stationary reference electrode is for fresh water or high-chloride water service (depending on chemistry).
- Special porous ceramic plug allows removal and re-entry into liquids without damaging the reference electrode.
- The unit is reusable and may be reactivated (after use) for periods of up to one year.
- High impact-resistant plastic electrode case will not deteriorate even in highly corrosive environments.
- Minimum 20 years of service life.
- Indefinite shelf life; indefinite stability.
- Available in four chemistries and color-coded for quick and easy identification: Pd-PdCl₂ (orange), Cu-CuSO₄ (yellow), Ag-AgCl (blue), Zn-ZnSO₄ (red).
- Technologically-advanced "ion trap" prevents contamination of internal electrolytes.
- Two levels of chloride ion trapping technologies are used in the Stelth® 8 reference electrode:
 - First, we impregnate a trapping material into the ceramic sensing tube that traps chloride ions before they reach the chemistry of the Stelth® 8.
 - Second, we employ a chloride ion trapping system that removes chloride ions that penetrate the chemistry of the Stelth® 8 before these ions can cause damage.
- **Note:** The Stelth® 8 cu-cuSO₄ and zinc-zinc sulfate reference electrodes are stable up to levels of up to 1,000 parts per million chloride plus bromide. The BORIN Stelth® 8 silver-silver chloride reference cells are optimized for a chloride level of 19,000 parts per million (seawater) but can be used in environments with lesser or greater chloride levels, but with reduced life. BORIN's newly-developed palladium Stelth® 8 reference electrodes are immune to chloride count issues and can be utilized in problem zones which have stunted use of traditional chemistries, such as areas that have too many parts per million of chlorides for silver reference electrodes.
- Each BORIN® Stelth® 8 Solid-State reference electrode is individually tested, certified, and has a unique serial number, allowing for traceability of any single cell throughout its lifetime.
- Complete operating instructions included.

Material: 18.8 Stainless steel, aluminum, non-stick coating, and a ceramic plug with moisture retention membrane.

Long Term Stability Range: ±10 millivolts with 10 megaohm load.

Certified Potential Range: ±5 millivolts with 10 megaohm load.

Maximum Continuous Current: 0.3 microamps.

pH Range: 4–9 pH.

Working Temperature Range: 32° F to +176° F (0° C to 80° C).

Material Temperature Range: -60° F to +185° F (-51° C to 85° C).

BORIN® Stelth® 8 Solid-State Reference Electrode for Thru-Hull Tanks

Stelth® 8 – Model SRE-050-HCP

Hydro-Carbon Proof (Pd-PdCl₂)

For storage tank “Thru-Hull” applications in *any chloride* environment.

Stelth® 8 – Model SRE-034-CTY

Copper-Copper Sulfate (Cu-CuSO₄)

For storage tank “Thru-Hull” in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

Stelth® 8 – Model SRE-035-STB

Silver-Silver Chloride (Ag-AgCl)

For storage tank “Thru-Hull” in *chloride* environments.

Stelth® 8 – Model SRE-036-ZTR

Zinc-Zinc Sulfate (Zn-ZnSO₄)

For storage tank “Thru-Hull” in *low chloride* environments (can tolerate chlorides up to 1,000 ppm).

BORIN® Stelth® 9 Solid-State Reference Electrode for Deep Water Service



- Designed for emersion in water (sea or fresh water) and will withstand high pressure at any depth.
- The Stelth® 9 deep-water stationary reference electrode is for fresh water, brackish water, or high-chloride water service (depending on chemistry).
- Available in 5, 10, 15, and 20 lb. weights.
- Deep water and high current applications.
- Requires no maintenance of any kind.
- Absolutely crush-proof at any depth.
- High-impact resistant plastic electrode body and stainless steel weight; case will not deteriorate even in highly corrosive environments.
- Minimum 20 years of service life.
- Indefinite shelf life; indefinite stability.
- Available in four chemistries and color-coded for quick and easy identification: Pd-PdCl₂ (orange), Cu-CuSO₄ (yellow), Ag-AgCl (blue), Zn-ZnSO₄ (red).
- Technologically-advanced "ion trap" prevents contamination of internal electrolytes.
- Two levels of chloride ion trapping technologies are used in the Stelth 9 reference electrode:
 - First, we impregnate a trapping material into the ceramic sensing tube that traps chloride ions before they reach the chemistry of the Stelth 9.
 - Second, we employ a chloride ion trapping system that removes chloride ions that penetrate the chemistry of the Stelth 9 before these ions can cause damage.
- **Note:** The Stelth® 9 cu-cuSO₄ and zinc-zinc sulfate reference electrodes are stable up to levels of up to 1,000 parts per million chloride plus bromide. The BORIN Stelth® 9 silver-silver chloride reference cells are optimized for a chloride level of 19,000 parts per million (seawater) but can be used in environments with lesser or greater chloride levels, but with reduced life. BORIN's newly-developed palladium Stelth® 9 reference electrodes are immune to chloride count issues and can be utilized in problem zones which have stunted use of traditional chemistries, such as areas that have too many parts per million of chlorides for silver reference electrodes.
- Each BORIN® Stelth® 9 Solid-State reference electrode is individually tested, certified, and has a unique serial number, allowing for traceability of any single cell throughout its lifetime.
- Complete operating instructions included.

Size: 5 pound: 1.87" (4.75cm) diameter x 20" (51 cm) long "space-age" ceramic tube.

Standard Lead wire: 100' (30.5 m) of #10 RHH-RHW black wire.

Long Term Stability Range: ±10 millivolts with 10 megaohm load.

Certified Potential Range: ±5 millivolts with 10 megaohm load.

Maximum Continuous Current: 0.3 microamps.

pH Range: 4–9 pH.

Working Temperature Range: 32° F to +135° F (0° C to 57.2° C).

Material Temperature Range: -60° F to +185° F (-51° C to 85° C).

BORIN® Stelth® 9 Solid-State Reference Electrode for Deep Water Service

Stelth® 9 – Model SRE-051-HCP

Hydro-Carbon Proof (Pd-PdCl₂)

For deep-water applications in *any chloride* environment (crush-proof and weighted).

Stelth® 9 – Model SRE-037-CSY

Copper-Copper Sulfate (Cu-CuSO₄)

For deep-water applications in *low chloride* environments (crush-proof and weighted).

Stelth® 9 – Model SRE-038-SSB

Silver-Silver Chloride (Ag-AgCl)

For deep-sea applications in *chloride* environments (crush-proof and weighted).

Stelth® 9 – Model SRE-039-ZSR

Zinc-Zinc Sulfate (Zn-ZnSO₄)

For deep-water applications in *low chloride* environments (crush-proof and weighted).