



ELECTRO-SCALE IONIZATION & ELECTROLYSIS • ESIL

Water made clean by electricity, not chemistry.

ESIL removes bacteria, heavy metals and disinfection by-products from drinking water using low-voltage electrolysis — and leaves the minerals your body needs in the glass. Here is the science, the peer-reviewed record, and what an Acuario machine did in Baja.

- Peer-reviewed • Journal AWWA (2000)

- Patented worldwide

- 30+ years of third-party lab testing

- Verified to NOM-127-SSA1-2021

HOW IT WORKS

Four steps, no added chemicals

A low-voltage direct current runs through the water in a cell of concentric electrodes. That current does the work a bag of coagulant chemicals normally does — then standard filters carry the waste away.

STEP 01

Charge the water

Low-voltage DC passes through the electrode cell. No moving parts, pennies of electricity per day.

STEP 02

Bind the bad

The current turns dissolved contaminants — metals, organics, pathogens — positive, so they clump into a visible floc.

STEP 03

Filter it out

The clumped floc is now large enough for ordinary sediment and carbon filters to capture and remove.

STEP 04

Polish & protect

A coconut-carbon block removes any chlorine or ozone generated in the process. Clean water at the tap.

- ✓ **The minerals stay.** Contaminants carry a negative charge and are pulled out; mineral salts (calcium, magnesium, potassium) are positive and are repelled — so they remain in the water. This is the opposite of reverse osmosis, which strips everything.

THE PEER-REVIEWED RECORD

Published in the Journal of the American Water Works Association

The electrocoagulation process behind ESIL was documented in a peer-reviewed AWWA paper (June 2000). Samples were analysed by independent laboratories. Selected results:

Contaminant removal — independent lab analysis			Journal AWWA, 92(6), 2000
E. coli bacteria Lake Ontario, inoculated	BEFORE >100,000 /mL	AFTER <1 /mL	 Below detection limit · ~log 4.17
Molybdenum Mining-site leachate	BEFORE 9.952 mg/L	AFTER 0.006	 99.9% reduction
Iron Landfill leachate	BEFORE 130 mg/L	AFTER 0.015	 99.99% reduction
PCBs Aqueous emulsion, ~30 min batch	BEFORE 3,300 mg/L	AFTER 0.2	 99.99% reduction

The process has no moving parts and operates at roughly \$0.023 / m³ in direct running cost. Bacterial kill is driven by reactive oxygen intermediates (OH and O radicals) produced during electrolysis — not by dosing chemicals.

What it did in real houses

Independent third-party trials on residential water (labs: Maxxam, Near North). Every result below was measured at the kitchen tap after full treatment.

CHAPLEAU, ON • FIRST NATION TRIAL

97.9%

Trihalomethanes (THMs) removed

From 0.244 to 0.00562 mg/L — already beating proposed future limits of 40 ppb. Standard carbon filtration in the same study left THMs above target.

CHAPLEAU, ON • HEAVY METALS

79% Pb

Lead down, aluminum & nickel to non-detect

Lead 4.2 → 0.86 ppb (79%), copper 73%, aluminum and nickel to non-detect — while calcium, magnesium, potassium and sodium stayed unchanged.

MINDEN, ON • WELL WATER

ND

Chromium-6 removed to non-detect

Hexavalent chromium — the contaminant behind the Erin Brockovich case — reduced to non-detect, with pH stabilised across a 95%+ contaminant reduction.

PEMBROKE, ON • TANNINS

88%

Tannic acid removed after \$25k of failures

3.4 → 0.4 ppm in one 45-minute install, after six other treatment methods (tannin, iron, softener, chlorine) had failed the homeowner.

Our own machine, tested in Baja

THIRD-PARTY LABORATORY RESULT

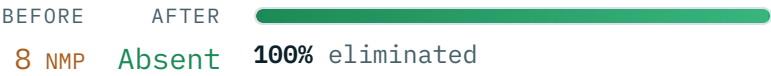
Paper Tiger fill station — Todos Santos, BCS

COMPLIES
NOM-127

Sampled 9 May 2026 · Lab: ELI S.A. de C.V., CDMX
Standards: NOM-127-SSA1-2021 · NOM-201-SSA1-2015 · Ref 6129-0010/0011

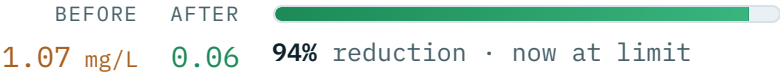
Total coliforms

Bacteriological



Nitrites

Was 18× over the legal limit



Total hardness & minerals

Calcium, magnesium



Free chlorine reads 0.0 mg/L by design: the system removes chlorine — including any generated during ionization — as a final coconut-carbon step, for clean, chemical-free water at the point of use. Residual chlorine in the municipal distribution network remains the utility's responsibility. Treated output complied with NOM-127-SSA1-2021 on all tested parameters.

What ESIL has been shown to remove

Across 30+ years of independent reports and Acuario's own Baja test, ESIL has demonstrated removal across four families of contaminant — while leaving dissolved minerals in the water. Strongest documented figures shown; source keyed below.

● Bacteria & pathogens Killed by electrolysis by-products, no chlorine dosing E. coli >100,000 → <1 AWWA 2000 Total & fecal coliforms → Absent BAJA 2026 Heterotrophic bacteria 60,000 → <500 AWWA 2000 Salmonella Absent BAJA 2026 Pythium High → Low water mouldSGS 2017	● Heavy metals ICP lab panel & field trials Lead up to 97.7% METALS 1996 Mercury up to 99.8% METALS 1996 Zinc up to 99.6% METALS 1996 Cadmium · Nickel · Copper 93–99% METALS 1996 Chromium-6 → non-detect hexavalentCR-6 1990 Aluminum → non-detect CREE 2016 Molybdenum · Iron 99.9%+ AWWA 2000
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● Organic & industrial

Electrochemical breakdown & coagulation

PCBs **3,300 → 0.2 mg/L**
AWWA 2000

Chlorobenzenes, dioxins/furans **Reduced**
WEBBER

Crude oil / petroleum **Removed**
AWWA 2000

Tannic acid **88%**
colour, odour PEMBROKE

Pharmaceuticals **Tested***
CREE 2016

● By-products & nitrogen

The contaminants conventional treatment creates or misses

Trihalomethanes (THMs) **97.9%**
CREE 2016

Chloroform **97.6%**
CREE 2016

Haloacetic acids (HAAs) **Reduced**
CREE 2016

Nitrites **94%**
BAJA 2026

Turbidity · phosphates · solids **Reduced**
AWWA 2000

SOURCES — AWWA 2000: peer-reviewed Journal AWWA · Metals 1996 & Cr-6 1990: ESI reports by M.E. Neale, Chartered Chemist · Webber: Dr. Ian Webber, PCB remediation · Cree 2016: Chapleau First Nation trial (Maxxam / Near North labs) · SGS 2017: SGS Canada · Baja 2026: ELI lab, NOM-127.

*Pharmaceuticals were tested in the Chapleau trial (results in that report's appendix). Removal percentages vary with source-water chemistry. Virus removal is not claimed. Dissolved minerals — calcium, magnesium, potassium, sodium — are deliberately retained, not removed.

HOW IT COMPARES

ESIL vs. the usual options

	ESIL	REVERSE OSMOSIS	CARBON / UV ONLY
Removes heavy metals	Yes	Yes	Limited
Removes THMs / organics	Up to 97.9%	Partial	Falls off at home flow
Kills bacteria	Yes (electrolysis)	Partial	UV only
Keeps healthy minerals	Yes	No — strips them	Yes
Wastes water	No	Yes (reject water)	No
Added chemicals	None	None	Varies
Maintenance	Vinegar rinse, long cell life	Membrane changes	Frequent cartridges

THE ORIGIN

ESIL is the work of founder Brian Cool, who invested more than US\$30 million over two decades to perfect it — the foundation for 30+ years of third-party lab testing, engineering-stamped studies, and patents granted around the world.

Sources & references

1. Mills, D. (2000). *A new process for electrocoagulation*. Journal AWWA, 92(6), 34–43. Peer-reviewed. Patents US 5,108,563 & 5,439,567.
2. ESIL Water Treatment (2015–16). *Chapleau (Cree First Nation) home-treatment trial*. Independent labs: Maxxam Analytics, Near North Laboratories.
3. ESIL Water Treatment field case studies: Minden ON (chromium-6), Pembroke ON (tannins), Elmira ON (dairy well), Cambridge ON.
4. Neale, M.E. (Chartered Chemist, MRSC). *Effect of the ESI device on metals-finishing effluent — hexavalent chromium* (Report ESI-12-90, 1990); *Application of ESIL technology to heavy metals* (ICP panel, 1996); *Reclamation of "heavy" organic-contaminated water* (Report ESI-30A-91, 1991).
5. Webber, I. (PhD). *Remediation of PCB-contaminated soils / destruction of PCBs in water and soil — dechlorination of PCBs, chlorobenzenes, PCDFs/PCDDs*.
6. SGS Canada (2017). *Analysis Report GU17-00561 — Pythium spp. reduction in greenhouse irrigation water*.
7. ELI S.A. de C.V. (May 2026). *Acuario Baja — Paper Tiger fill station, Todos Santos*. NOM-127-SSA1-2021 (MOD), NOM-201-SSA1-2015.

Prepared for Acuario · Technology reference · Figures quoted from the source documents listed above. Not a medical claim.