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FLOTATION TECHNOLOGIES

Water Treatment Capability

A capability overview · CAST Capillary Action Separation Technology

Proven pretreatment that extends the life of every treatment train.



Non-confidential · for general distribution · August 2026

1. Executive summary

CAST is a modular water pretreatment unit that installs ahead of existing or planned treatment, is delivered as a service rather than a capital purchase, and is always proven first on the client's own water in a paid pilot. It does not replace a system's core treatment or its operator. It protects those assets, extends their life, and helps turn compromised sources and treated effluent into dependable water. This overview sets out, in one place, what CAST does and where it fits across the water sector.

2. The water challenges CAST addresses

Several pressures now bearing on water systems are, at their core, problems of water quality — which is where pretreatment helps.

- **Constituents of concern that resist treatment.** PFAS, fine and colloidal suspended solids, oils, organics, and metals overload conventional processes and foul the media and membranes behind them.

- **Sources under stress.** Drought, saline intrusion, and declining source quality force more water to be recovered from harder, more variable feeds.
- **Tightening discharge limits.** Rising limits on PFAS, suspended solids, oil and grease, and metals, alongside growing expectations for reuse and freshwater reduction.
- **Effluent that should be a resource.** Treated wastewater is largely discharged rather than reused, even as tertiary treatment and reuse policy expand.
- **Treatment that is expensive to run.** Media replacement, membrane fouling, chemical dosing, and disposal are the recurring costs that pretreatment is built to cut.

3. What CAST is

CAST stands for Capillary Action Separation Technology. It is a pretreatment unit that installs ahead of a system's existing or planned treatment and improves the performance and economics of whatever sits behind it. The train combines four stages, matched to the water: hydrophilic capillary separation that lifts fine particles, oils, and organics at low energy; selective ion exchange that captures target organics, PFAS, and metals; an optional granular activated carbon polish; and integrated sensors and software for low-touch operation. Three characteristics matter for any water program:

- **Units only and modular.** Field-deployable skids that scale by adding capacity for phased or distributed needs.
- **Matched to the water.** A treatment train configured for the specific water chemistry rather than a fixed one-size package.
- **Delivered as a service.** A lease-plus-usage basis that shifts spending from the capital budget to the operating budget and makes it fast to pilot.

4. How CAST applies across markets

A. Protecting surface-water plants

Placed ahead of a surface-water plant, CAST removes the fine solids and organics that drive turbidity excursions, so the plant behind it runs steadier through weather events.

B. Membrane and desalination pretreatment

Where systems turn to reverse osmosis or desalination against drought and saline intrusion, CAST removes the fouling precursors that shorten membrane life, lowering operating cost and lifting recovery.

C. Turning treated wastewater into a reuse resource

As treatment moves toward tertiary standards, the same pretreatment step polishes treated effluent so it can be reused in agriculture or industry, easing pressure on freshwater.

D. PFAS in drinking water

Ahead of ion exchange or granular activated carbon, CAST materially extends media life, cutting the largest recurring cost in PFAS removal.

E. Oil and gas produced water

CAST removes solids, oils, and organics ahead of reuse, reducing disposal volume and enabling recycling.

F. Industrial water and metals

CAST serves as reuse pretreatment and metals capture, reducing discharge load and recovering reverse-osmosis reject.

In every case the pattern is the same: CAST protects, rather than replaces, the treatment investments a system already operates or plans.

5. Expected performance envelope

The ranges below are what CAST is expected to deliver, based on bench and pilot experience. They are indicative, not a specification, and are confirmed per water matrix in a pilot.

Measure	Expected result
Total suspended solids removed	90–99%

Measure	Expected result
Turbidity	to ~1–3 NTU
Oil and grease removed (when present)	over 90%
Chemical oxygen demand (hydrophobic fraction)	30–60% reduction
Single-pass TDS reduction	~30%, water-chemistry dependent
Membrane feed quality (SDI ₁₅)	below 3
Coagulant / chemical dosing	10–20% less than conventional flotation
Downstream ion-exchange resin life (PFAS)	extended several-fold
Water recovery (with downstream high-recovery RO)	from ~75–80% toward 90–95%

Water-recovery gains assume a downstream high-recovery or closed-circuit reverse-osmosis stage. Dissolved salts pass through CAST and are addressed downstream. All values are expected, bench- and pilot-based ranges and are site-specific.

6. Mapping needs to CAST

Need	CAST role	Intended benefit
Turbidity spikes forcing plant shutdowns	Pretreatment ahead of surface-water plants	Steadier uptime; fewer weather-driven outages
Drought / declining source quality	Recovers marginal source water; lifts downstream RO recovery	More usable water from existing sources
Membrane and desalination fouling	Removes fouling precursors ahead of membranes	Longer membrane life; higher recovery
Tertiary upgrades and reuse goals	Polishes treated effluent for reuse	Effluent becomes an agricultural or industrial resource

Need	CAST role	Intended benefit
PFAS in drinking water	CAST ahead of ion exchange or GAC	Extended media life; lower recurring cost
Oil & gas produced water	Solids, oil, and organics removal ahead of reuse	Less disposal; more recycling
Industrial process and discharge load	Reuse pretreatment and metals capture	Reduced discharge; water reuse

Illustrative alignment only; scope and results are confirmed on the specific stream in a pilot.

7. What we can already show

- **Independent bench testing.** In independent third-party bench-scale column testing, adding CAST ahead of ion exchange extended run length more than eightfold before breakthrough and delayed PFOS breakthrough past the 4 ng/L threshold, while reducing column fouling. Longer runs cut media replacement, the single largest recurring cost.
- **PFAS field pilot.** In a supervised field pilot on PFAS-impacted groundwater, CAST pretreatment reduced 42 PFAS compounds to non-detect under continuous third-party monitoring and precipitated manganese out of the stream.
- **Federal recognition.** CAST received a Department of the Air Force SBIR Phase I award for PFAS/PFOS water remediation.
- **Protected technology.** United States non-provisional and Patent Cooperation Treaty applications were filed on February 19, 2026.
- **Pilots underway.** Paid pilots are running now across municipal and industrial settings, with third-party performance testing completed.

8. Honest boundaries

- **Not disinfection.** CAST reduces the load on disinfection and improves its efficiency, but it does not replace chlorination, UV, or a utility's public-health barrier.

- **Not standalone desalination.** CAST reduces a share of dissolved solids depending on chemistry; removing salt to potable levels is done by a downstream membrane stage.
- **Site-specific.** Removal figures depend on the source water. We do not carry one site's numbers onto another; we measure them in a pilot.
- **Complementary.** CAST is designed to strengthen existing plants and operators, not to compete with them. It removes and concentrates constituents of concern such as PFAS; it does not destroy them.

9. A low-risk way to adopt it

- **Water as a service.** Lease-plus-usage rather than a capital purchase, so spending sits in the operating budget and scales with use. The model fits public-private and blended-finance structures.
- **Pilot first.** CAST is proven on the actual target water before any scale commitment, with removal, breakthrough, and recovery documented.
- **Modular and scalable.** Begin with a single unit on one stream; add capacity as results justify, phased or distributed as the program requires.

10. A suggested path from here

1. **Share representative water data.** A few weeks of characterization for a candidate stream: flow, total suspended solids, turbidity, chemical oxygen demand, oil and grease, and metals.
2. **A 60-minute scoping call.** To define pilot goals, tie-in points, and a sampling plan on the target stream.
3. **A one-page value case.** Built from current treatment, disposal, and chemical costs for that stream.
4. **A paid on-site pilot.** CAST run on the real stream, documenting removal, breakthrough, and recovery before any scale decision.

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Proven pretreatment that extends the life of every treatment train. Modular units, delivered as a service, pilot-first.

STRATEGIC ADVISORS

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