



EDGE<sup>®</sup> Technology

# Get the Competitive EDGE<sup>®</sup>

Impurities are the bane of crude oil production. Salty stowaways, solids and unwanted water can erode your equipment and your profits. Effective desalting and dehydration lowers transportation costs from conditions such as increased viscosity while minimizing the formation of hydrochloric acid – a primary cause of corrosion failures in crude unit equipment.

Forum is the sole authorized manufacturer of industry-leading EDGE desalter and dehydrator equipment. Our solutions combine Howe-Baker's 75-year performance legacy with cutting-edge technologies that resolve today's most challenging production needs. We are the only official supplier of designs, support and manufacturing for these proprietary products.

EDGE solutions rank as the industry's best desalters and dehydrators, built upon an AC-type electrostatic coalescing process that efficiently treats crude oil. Applying electrodes to oil-and-water mixtures creates high-voltage electrical fields that excite embedded brine droplets. As they separate and fall away from the crude, excess water and solids wash out and leave cleaner oil for downstream refining.

## Available Designs

EDGE products readily adapt to numerous desalting/dehydrating needs, and our field experts offer customized retrofit solutions and pilot plant services. Forum's agile, customer-focused teams provide the best technical support in the oil and gas industry.

Developed in accordance with industry standards such as ISO certification, EDGE products are a leading choice of oil and gas operators and are in service all over the world.

## Key Benefits

- **Reduced salt carryover.** Minimizes corrosion, chemical/maintenance costs, unplanned shutdowns.
- **Lower water carryover.** Manages energy costs, stabilizes unit operations, boosts crude throughput.
- **Minimized oil undercarry.** Reduces product losses and slop treatment costs.
- **Less solids carryover.** Protects equipment from fouling and foaming.
- **Higher water content manageability.** Provides better control of oil-water ratios.
- **Decreased power consumption.** Injects crude/water emulsion below high-intensity electrode grids.
- **Simplified design.** Supports easier installation and maintenance.
- **Enhanced performance capability.** Integrates with ForuMix™ high-efficiency multiphase mixer.



# EDGE I



EDGE I (Enhanced Deep-Grid Electrical) is Forum's widely deployed desalting/dehydrating solution, sharing the same technical foundation as the EDGE II/EDGE III options. Every detail is meticulously crafted to create the industry's most effective solution for removing water and contaminants – sodium, calcium, magnesium chloride & others – from crude oil.

At the heart of this unique design are three variable-electrified electrode grids that maximize the performance and feedstock capacity of the desalter vessel. It minimizes transactor (electric power supply) capacity and power consumption while optimizing the recommended demulsifier and solids-wetting chemicals of most chemical suppliers.

Here are just a few of the careful details that make the core EDGE technology so effective:

The entire hydrocarbon volume of the vessel is exposed to high-voltage AC electrical fields that span from the oil-water interface to the top of the vessel.

Low- and high-intensity electrical fields are designed to work together for maximum efficiency. The bulk of water separates in the low-intensity electrical fields, reserving high-intensity fields for more complicated emulsions.

These deeper fields create excellent coalescence of small and highly emulsified water droplets, removing final traces of water while conserving power.

Double bushings in the oil-filled housing provide extra protection for the high-voltage entrance system. Multiple transactor secondary voltage levels optimize performance by providing flexibility for varying operating conditions.

Evenly distributing oil-water emulsion across an entire vessel length produces a laminar profile. Because the inlet header injects emulsions just above the oil-water interface, it maximizes residence time and improves upset tolerance. Spray nozzles in the mud wash headers offer a superior design to fluidize solids at the bottom of the vessel

## Applications

- Lighter crudes
- Crudes in production applications
- Crudes with high water content

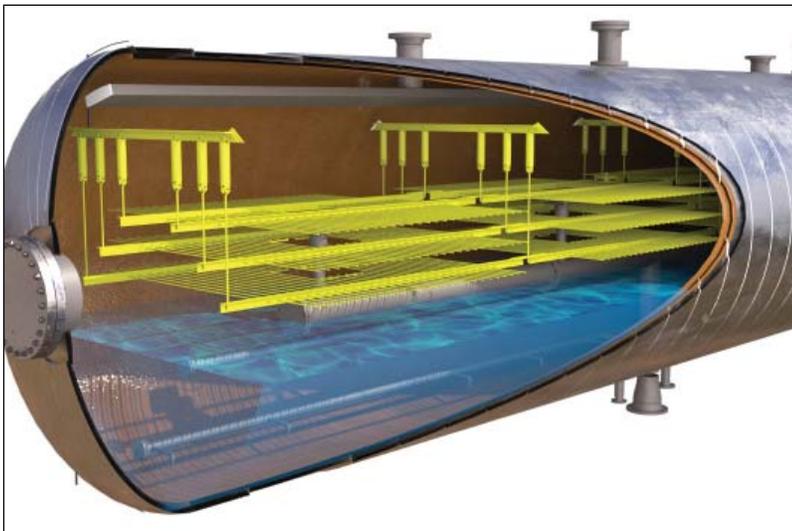
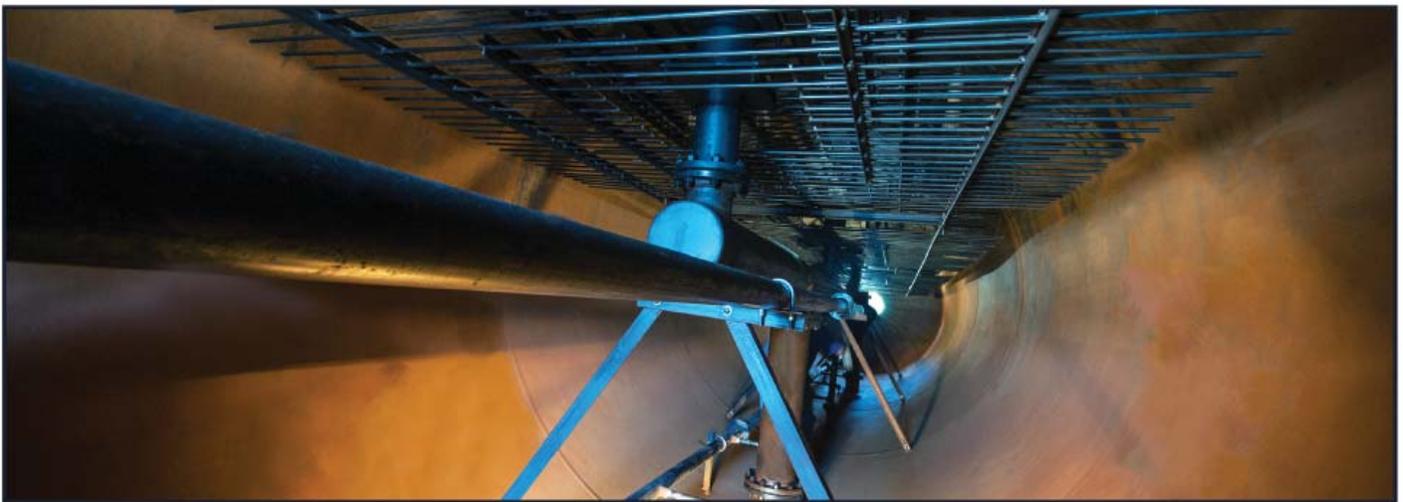
# EDGE II

Leveraging the same core capabilities as EDGE I, EDGE II desalters/dehydrators are specifically designed for difficult-to-treat crude oils. A unique dual-flow distribution creates rapid coalescing of water droplets in high-viscosity oil and also a more uniform laminar flow pattern. Maximizing the volume and duration of emulsion interface with the unit improves effluent water quality and reduces chemical requirements.

Dual horizontal flow distribution provides quick, complete coalescence that ensures larger droplets and faster settling. This unique design improves laminar flow and enhances the water droplet environment for emulsion-sensitive crude oil.

EDGE II units are available in one-, two- and three-electrode configurations, based on power availability. Distribution and electrode locations vary depending on specific processing and operational needs. Intelligent electrode design reduces power consumption while improving performance.

The three-electrode grid design also provides flexibility to handle upsets and long-run cycle between maintenance shutdowns. Transformer connection and phasing prevents almost all performance reduction due to loss of an energized electrode. The lower electrode provides a high-intensity field for continuous resolution of rag emulsion, improving interface control and chemical reduction. Solid-steel rod electrodes ensure long life and low maintenance.



## Applications

- Heavy or high-viscosity oil
- Crude oil with high solids content
- Synthetically produced oil
- Emulsion-sensitive feed stocks
- Better throughput rates in existing vessels
- Greater flexibility in changing feedstocks

# EDGE III

Processing different crude slates demands technologically advanced desalters that can accommodate a broad range of emulsion types. Flow rates or water content fluctuations can spike operating costs if the desalter is slow to react to varying feedstock properties.

EDGE III is uniquely qualified to address high chemical and energy consumption while improving crude quality and reducing operating costs. By combining EDGE I and EDGE II systems into one vessel, it provides maximum flexibility for processing multiple types of crude oil while eliminating the cost and maintenance associated with multiple desalter/dehydration units.

Capitalizing on the efficiency of multiple low- and high intensity electrical fields, EDGE III processes brine water and tight emulsions while conserving maximum power. A single unit can process flows ranging from light, high-water crudes to high-viscosity oil embedded with thick solids. The internal design offers reduced hardware, while solid-steel rods resist high oxygen concentration and provide service life of more than 20 years. Durable insulators (grid hangers) offer the highest tensile strength in the oil and gas industry.

EDGE III is also fully compatible with the ForuMix™ high-efficiency, in-line multiphase mixer. This unique design creates homogeneous, adjustable shear force over the entire cross section of process flow. By evenly dispersing uniform drops of injection fluid into the main process flow, it supports high-efficiency mixing and flow homogeneity that dramatically improves flow separation.

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# Retrofit Advantages

The only constant in the oil and gas industry is change. Maturing wells begin producing different types of crude. Production expands into unconventional plays. Tighter budgets demand newer technology options.

Cost-effective change is rarely based in a simple “out with the old, in with the new” mentality. Sometimes the best solutions mean taking what is already proven to work and carefully refining to make it even better.

The salinity of produced brine water can spike as high as 250,000 parts per million. An underperforming desalting system can leave thousands of pounds of unwanted solids clinging to your oil, increasing operation risks and transportation costs while reducing product quality. Retrofitting outdated equipment can be a very effective long-term decision for leaner operations and better profits.

Forum’s field teams combine deep technical excellence with practical, hands-on experience. From initial consultations to equipment removal to final installations, we proudly offer one of the industry’s most customer-focused experiences. Our tailored, turn-key solutions are designed to give you the confidence of a world-class retrofit while allowing you to focus on managing your operations.

Revamp and retrofit your desalting system with the industry’s most experienced technical partner.



# Aftermarket Sales & Support

Forum values lasting relationships, and purchasing an EDGE solution is only the start of our long-term commitment to your success. Our TWIC-certified global team supports numerous types of electrostatic equipment with a broad range of aftermarket services and parts, including:

- Inspections, observation, optimization and performance evaluations
- On-site and remote troubleshooting
- Site assistance for new and retrofit installations
- Commissioning and start-up services
- On-site operator training
- Entrance bushings and replacement bushing housings (various body materials)
- CN registration and ATEX certification
- Alloy and carbon-metal insulator products
- Wire and weight connection kits
- Transactor retrofits, replacements and parts
- Monitoring panel replacement and parts



Forum also supplies an extensive catalog of high-voltage entrance bushing products suited to low- and high-velocity dehydrator/desalter applications, such as retrofits. Features include:

- Solid-metal conductor construction sans solder connections
- Thermal cycle-resistant with T-housing installation
- Simplified installation with no vessel entry
- Alloy cable/connection kits available with each bushing

Bushing Model	Body Material	Operating Temperature	Operating Pressure (Max.)	Connection Type	Equipment Use
EB2	PTFE	Up to 350°	300 psi	2" flange	Desalter/dehydrator
EB3	PTFE	Up to 350°	150 / 300 psi	3" flange	Desalter/dehydrator
EB4	PTFE	Up to 350°	150 / 300 psi	4" flange	Desalter/dehydrator
ESB4	PTFE	Up to 350°	150 / 300 psi	4" flange	Coalescer
EB1.5	PTFE	Up to 350°	300 psi	1.5 MNPT	Desalter/dehydrator
EB2	PEEK	Up to 400°	300 psi	2" flange	Desalter/dehydrator
EB3	PEEK	Up to 400°	150 / 300 psi	3" flange	Desalter/dehydrator
EB4	PEEK	Up to 400°	150 / 300 psi	4" flange	Desalter/dehydrator
EB1.5	PEEK	Up to 400°	300 psi	1.5 MNPT	Desalter/dehydrator
PS3	PTFE	Up to 350°	150 psi	3" flange	Power supply bushing

## Our Core Values

### No one gets hurt

The safety of our employees and customers is our first priority coupled with a healthy respect for the environment.

### Integrity

In everything we do, in every interaction, both internally and externally, we strive to operate with the utmost integrity and mutual respect.

### Customer focused

Our products enhance our customer's performance and we listen to their needs and work with them to solve their challenges.

### Good place to work

We are committed to creating a workplace that fosters innovation, teamwork and pride. Every team member is integral to our success and is treated equally and fairly.



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