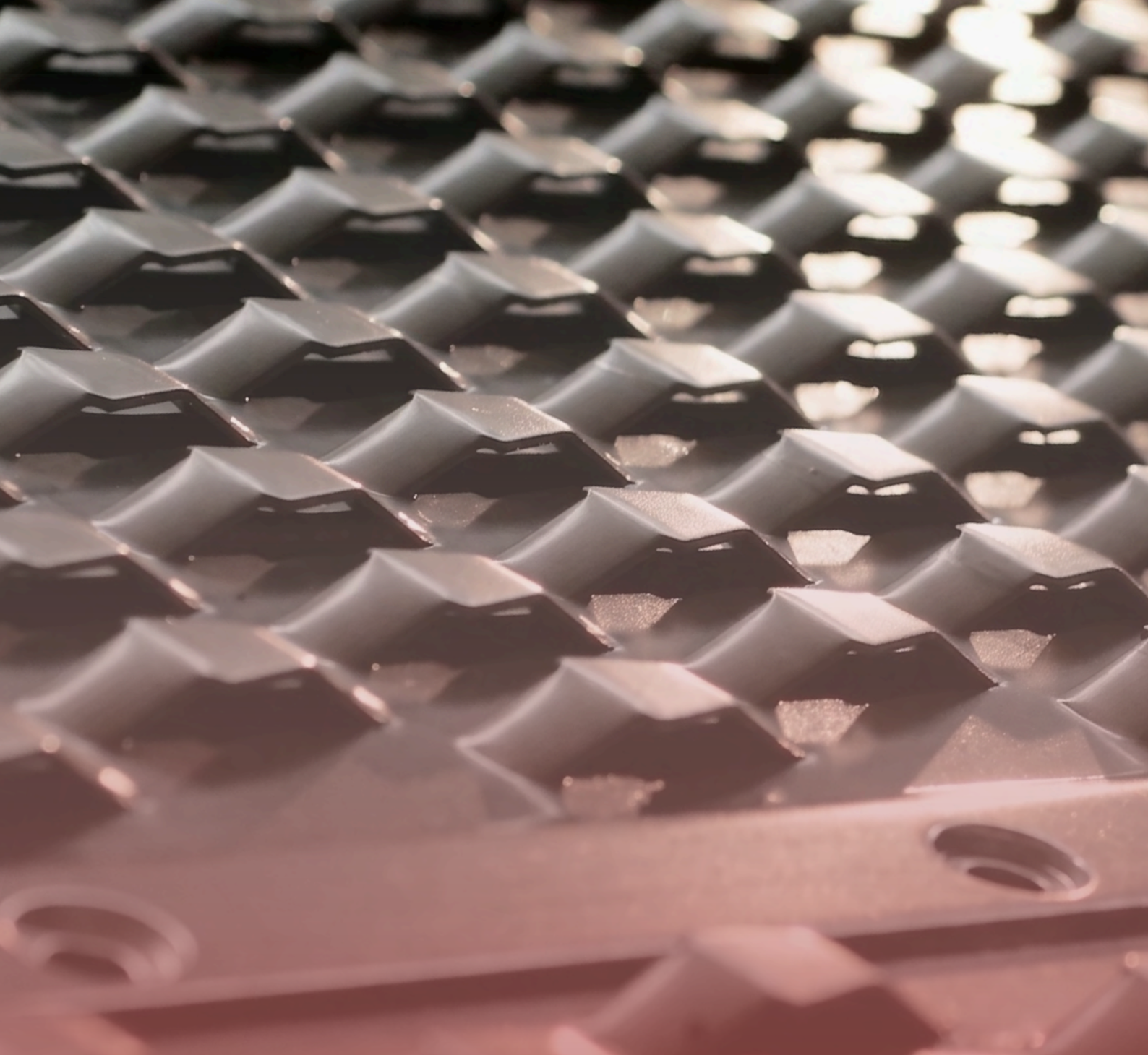




TECHINICAL BROCHURE

Fractionator Trays for Mass Transfer Technology

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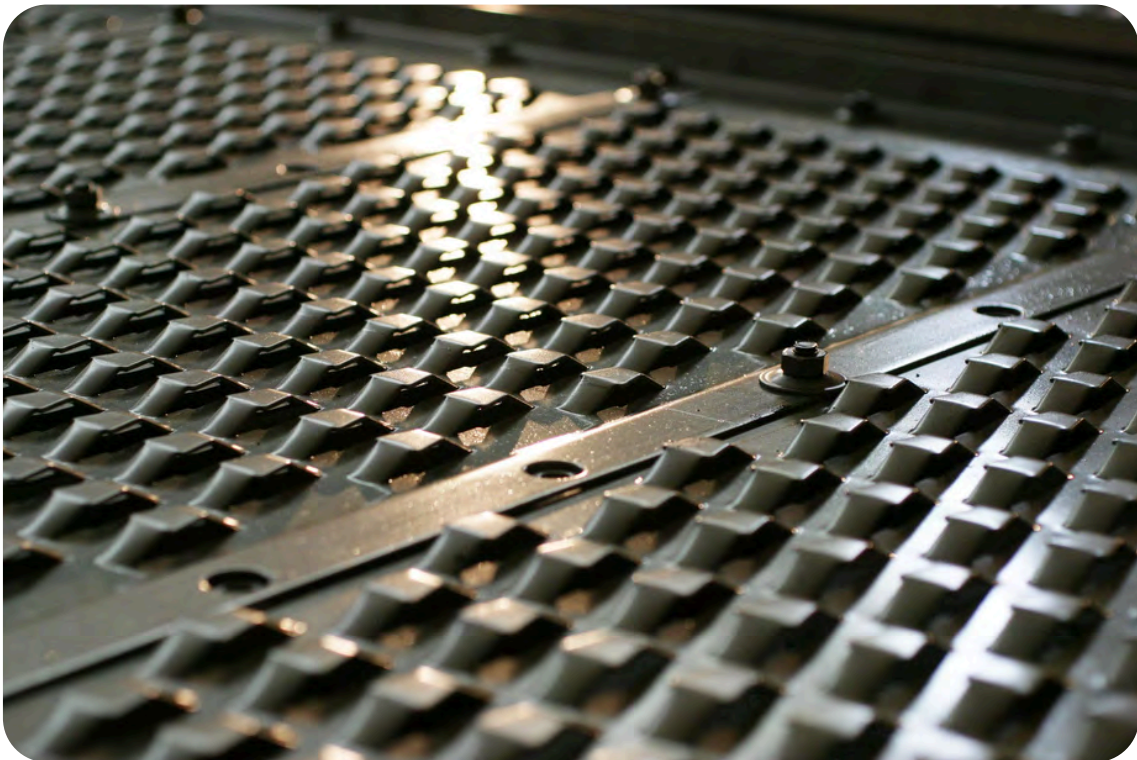
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Baretti Fixed Valves Trays

GENERAL INFO

In highly fouling, polymerizing, or slurry-heavy chemical services (e.g., FCC main fractionators, ethylene quench towers or acrylic acid units), traditional moving valves easily stick, spin, or clog. Fixed valves overcome this by utilizing the kinetic energy of the vapor stream right at the tray surface. This continuous sweeping action prevents the deposition of solids, catalyst fines, or heavy polymers, keeping the active bubbling area clean and maintaining extended column runtimes.



BARETTI FIXED VALVES TRAYS**Baretti BV-0**

The BARETTI Model BV-0 Fixed Valve represents a high-capacity, low-maintenance solution for modern fractionation tray technology. Punched directly into the tray deck plate.

The BV0 geometry features a rigid, extruded by the metal sheet designed to orient the rising vapor stream parallel to the liquid flow. This unique directional vapor projection drastically minimizes tower pressure drop and local hydraulic gradients, eliminating stagnant pool areas on the tray deck and providing exceptional capacity scaling under heavy loading.

Baretti custom-tailores the fixed valve height, pitch, and layout density according to the specific process operating envelope.



BARETTI FIXED VALVES TRAYS**| Baretti SVG**

The Fixed SVG valves tray requires virtually zero mechanical maintenance or inspections during plant turnarounds, drastically reducing long-term OPEX. To guarantee maximum lifecycle resistance against erosive slurry streams.

SVG layout completely eliminates the risk of valve sticking, spinning, or operational failure due to solids, catalyst fines, or heavy tar accumulation. The calculated opening design forces the rising vapor to discharge horizontally, inducing a continuous sweeping and self-cleaning action across the tray deck.



Baretti Floating Valves Trays

GENERAL INFO

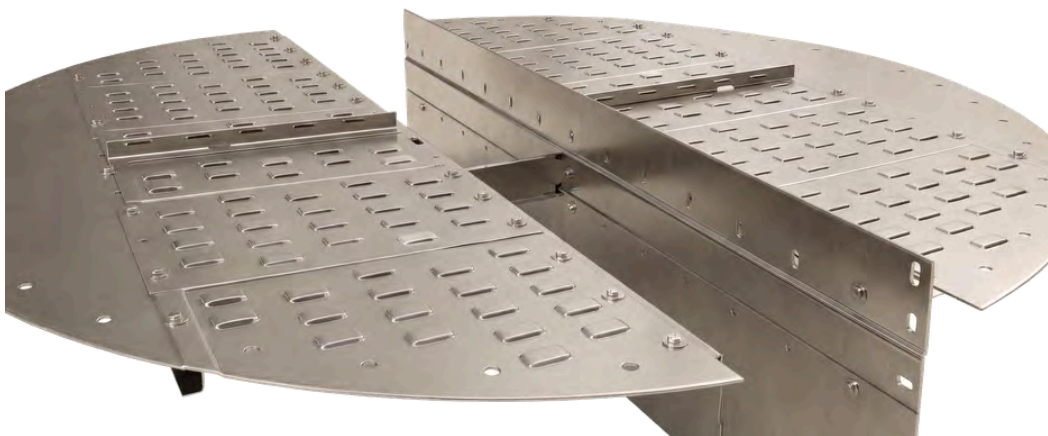
Floating Valves represent a highly versatile tray internal designed to actively adapt to the changing hydraulic and thermodynamic conditions within a fractionation column. By utilizing a dynamic, non-stationary float valves with metal legs or clips that automatically adjusts its vertical lift in response to varying vapor velocities, This self-regulating opening mechanism provides an exceptional operational range, maintaining high fractionation efficiency from minimum turndown up to maximum plant capacity rates without weeping or premature flooding.

Ensuring Wide Operating Range

To further extend the tower's operational flexibility, BARETTI custom-manufactures its entire portfolio of floating valve models across a wide spectrum of sheet metal thicknesses and weights. This precise mechanical calibration allows process engineers to dramatically broaden the unit's effective turndown range.

Under high vapor loads, complete valve lift is fully guaranteed to minimize pressure drop. Conversely, during low-throughput or turndown conditions, the carefully calculated heavier valves restrict their vertical lift. This intentional gravity-assisted resistance maintains an optimal vapor velocity through the orifices, successfully preventing premature liquid weeping and safeguarding mass transfer efficiency even at minimum plant operating rates.

To ensure flawless fluid dynamics, these heavier valves are first strictly modeled by our in-house engineering department and subsequently installed according to a highly precise, uniform distribution matrix across the entire active tray deck. This balanced layout prevents the formation of localized low-resistance paths (vapor channeling), forcing an identical vapor-liquid cross-flow distribution across every square millimeter of the bubbling area.



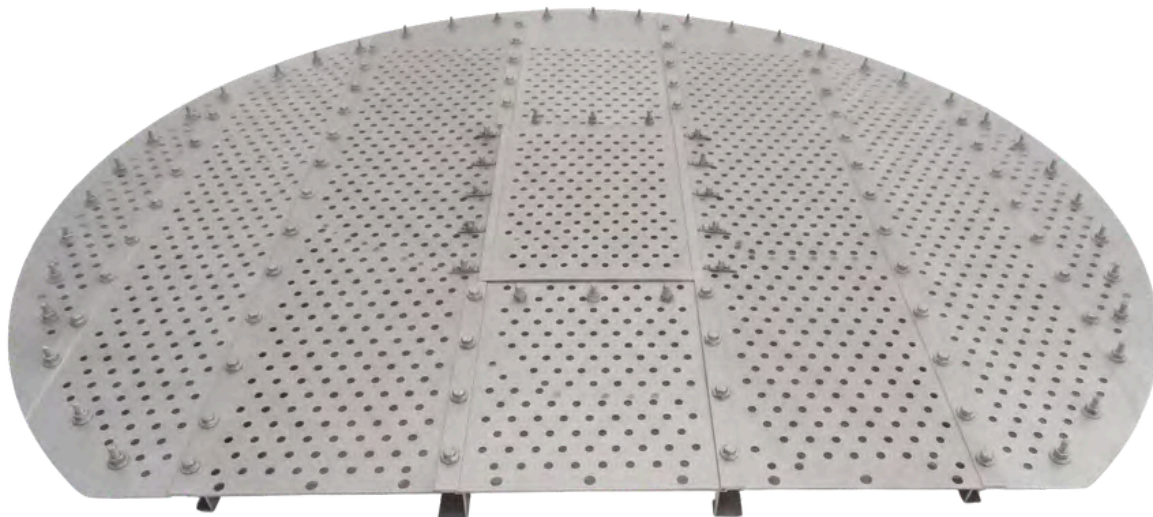
Sieve Trays

GENERAL INFO

Sieve Trays represent the conventional, most fundamentally straightforward internal architecture utilized in fractionation and distillation columns. The active bubbling area of the tray deck features a uniform, high-density matrix of simple, calibrated circular orifices (typically ranging from ½ inch to 1 inch in diameter)

Lacking any complex stamped shapes, cages, or moving elements, sieve trays are highly economical to manufacture and represent the lowest initial cost option for standard column configurations.

Furthermore, without moving pins or delicate legs subject to mechanical wear, chemical erosion, or high-pressure steam-out damage during turnarounds, the structural lifetime of the tray deck is longer.

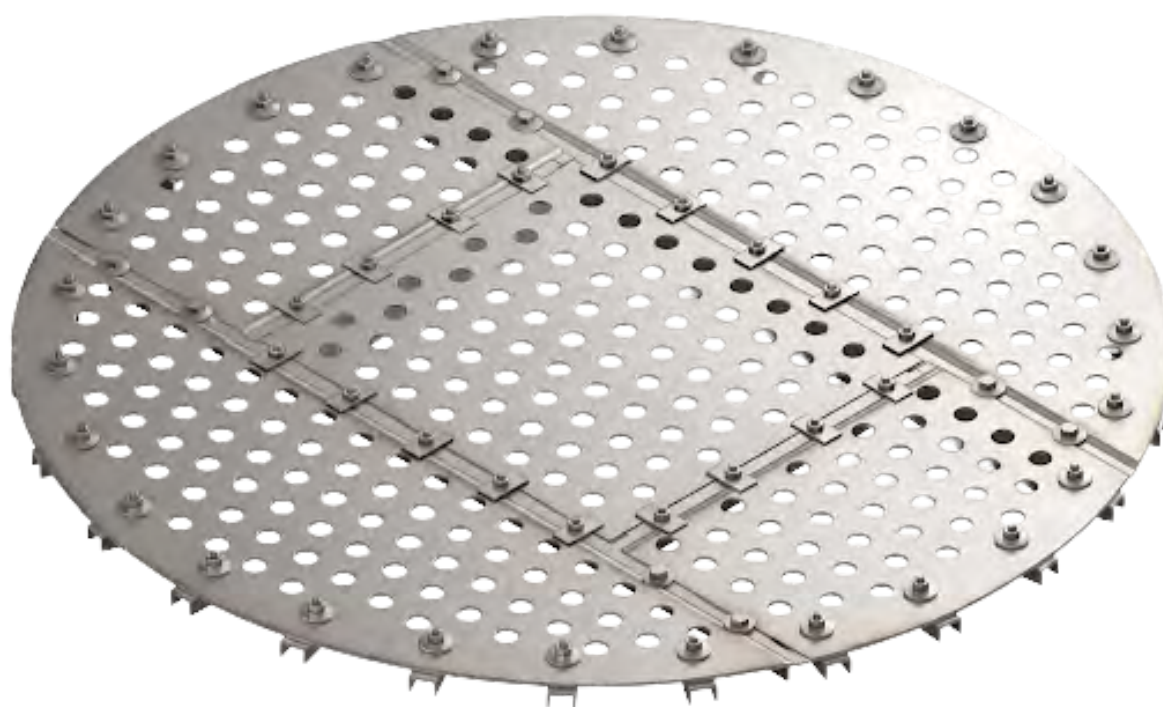


SIEVE TRAYS

Dual Flow Trays

Dual-Flow Trays represent a highly specialized, counter-current internal architecture designed without traditional downcomers or receiving pans. The active deck area consists of a completely flat plate uniformly perforated with larger circular holes.

Unlike conventional decks where vapor and liquid take separate operational paths, a dual-flow system forces both phases to pass counter-currently through the exact same perforations, establishing a dynamic, fluctuating mass transfer zone directly above the holes.



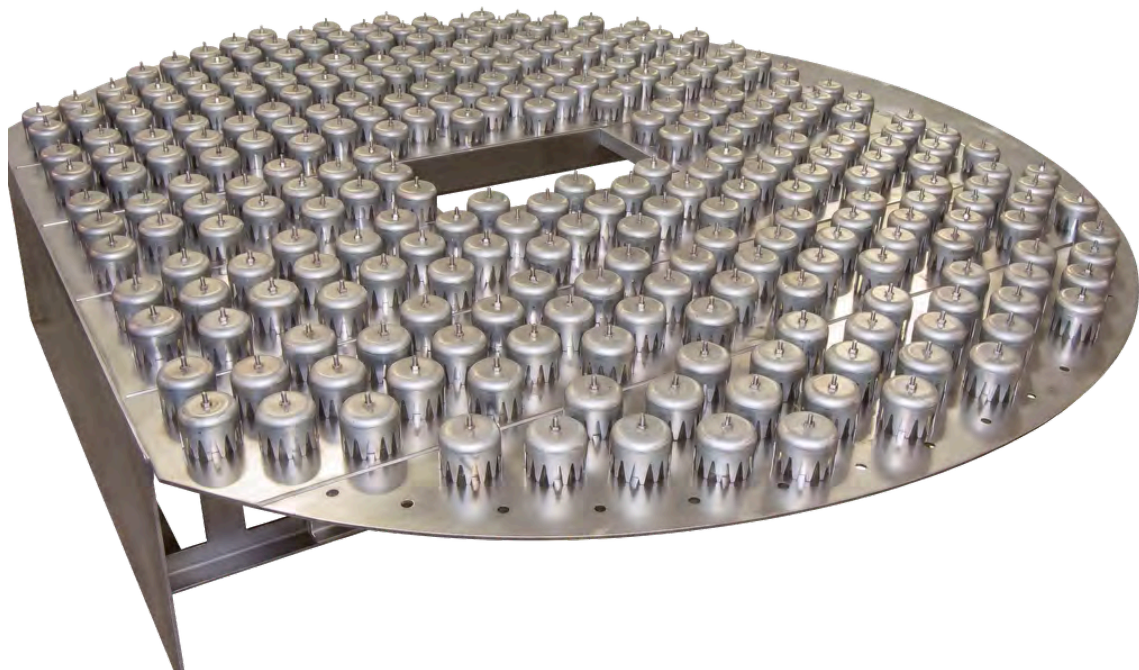
Bubble Caps Trays

GENERAL INFO

Bubble Cap Trays represent a time-tested, heavy-duty internal architecture designed for applications where fluid stagnation is required.

The design features a series of stationary circular risers (from 2 to 6 inches) mounted over the tray deck perforations, each covered by a slotted cap. The liquid level on the deck is intentionally maintained above the top of the slots, creating a permanent, positive liquid seal. As vapor rises through the risers, it is deflected downward by the cap and forced to bubble horizontally out through the slots directly into the liquid pool.

This design is highly specified in chemical processes where the column simultaneously functions as a biphasic chemical reactor, requiring a significantly high liquid volume on the deck (high hold-up/inventory) to guarantee the mandatory residence time necessary for the reaction to occur.



Baretti High-Performance Trays

BARETTI HIGH-PERFORMANCE TRAYS HPT

Fixed Microvalves Baretti BV-0

Baretti BV0 Microvalves represent Baretti's most advanced miniaturized fixed valve technology designed for maximum separation sharpness. By drastically reducing the fixed canopy profile and orifice size, this design allows for an ultra-high installation density per square meter of active deck. This geometry fractures the rising vapor into millions of microscopic streams, generating a dense, uniform froth that exponentially increases the vapor-liquid interfacial contact area and minimizes HETP.

Bubble Promoter

BARETTI Bubble Promoters are specialized sloped structures or corrugated strips placed right where the liquid enters the tray from the downcomer. Their main job is to instantly mix the incoming liquid with the rising vapor, turning it into a light foam before it moves across the deck. By mixing the fluids immediately, they stop the liquid from dumping straight through the first rows of holes (weeping), eliminate dead zones, and make the entire tray surface work more efficiently.

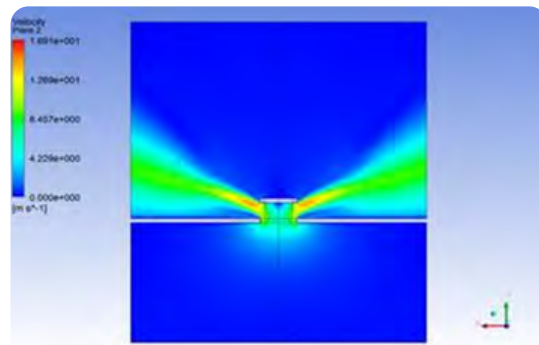
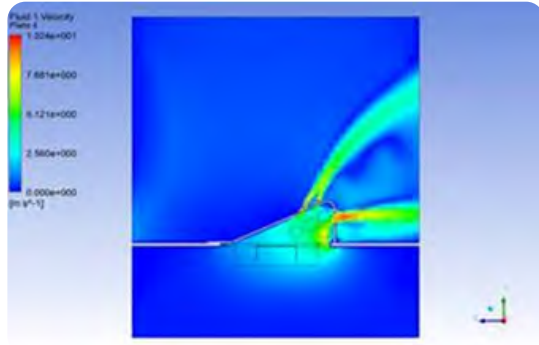
Surface Optimization with Swept Back Downcomer

High-performance configurations are integrated by an advanced **Swept-Back Downcomer** layout. Unlike conventional vertical or tapered downcomers that take up significant space on the tray deck, the swept-back geometry curves or steps the downcomer walls back toward the column shell right above the active bubbling area. This engineering modification achieves two vital process goals: It expands the effective bubbling area on the tray deck below, allowing for more valve installations and higher vapor handling.

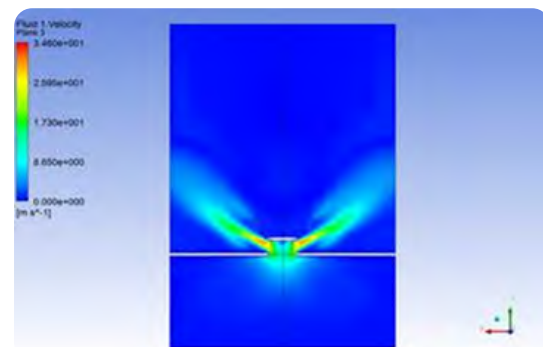
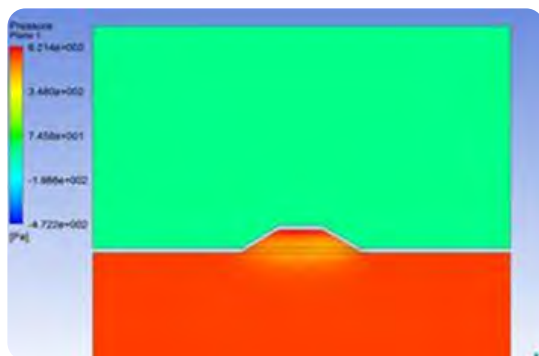
Materials of Construction

BARETTI custom-manufactures fractionator trays across a comprehensive selection of foil thicknesses and premium metallurgies. To meet diverse chemical and process requirements, our production capabilities span from **AISI 410 to the full AISI 300 series (including 304, 316L, 317L, and 321), Nickel Alloys, Copper, Duplex and Super Duplex, Monel, and pure Titanium**, ensuring ultimate mechanical life and maximum corrosion resistance.

Baretti Bubble Promoter CFD Study



Baretti BV-0 CFD Study

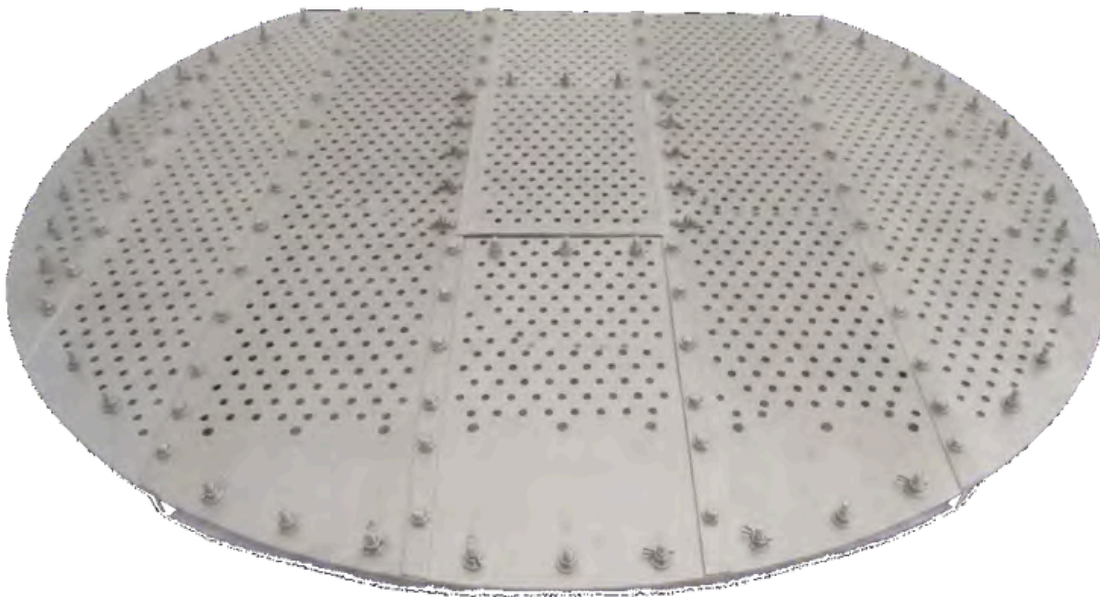


Liquid-Liquid Trays

GENERAL INFO

The mechanical layout of a liquid-liquid tray must tightly balance dispersion with dynamic phase separation:

- **Controlled Droplet Size:** The tray orifices are precisely engineered to prevent droplets from being too large (which drops mass transfer efficiency due to low surface area) or too small (which risks chemical emulsion and severe column flooding).
- **The Coalescence Layer:** After passing through the active area and mixing with the continuous phase, the dispersed droplets are given dedicated spatial zones to settle and coalesce back into a continuous liquid layer before entering the next tray stage.
- **Optimized Downcomers/Upcomers:** Because liquid-liquid density differences are significantly smaller than vapor-liquid variances, the downcomers (for heavy phase downward flow) or upcomers (for light phase upward flow) feature oversized cross-sections and deep hydraulic seal boundaries to allow sufficient settling time and prevent phase entrainment.



| Cartridge Trays

GENERAL INFO

Cartridge Trays are pre-assembled, modular multi-tray bundles with peripheral gaskets designed for rapid installation and easy maintenance without requiring internal manways.

BARETTI typically manufactures these bundles for column diameters below 800 mm, we can successfully design and produce them for larger diameters upon specific client request.



Baffle Trays

GENERAL INFO

BARETTI BaffleTrays utilize a robust, unperforated internal design featuring segmented metal sheets side to side type, shed trays and disc and donuts trays. One pass or two passes they have the best resistance to fouling.





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