



## Process Technologies that Advance Thermal Separations

The Artisan **Rototherm®** is a horizontal, mechanically-aided, thin-film processor designed to handle a wide range of evaporation and drying applications.

The bladed rotor creates a centrifugal force that keeps the feed against the heated process wall. The turbulent thin-film between the rotor blade and the process wall, covers the entire heated section at all times, regardless of feed or evaporation rates.

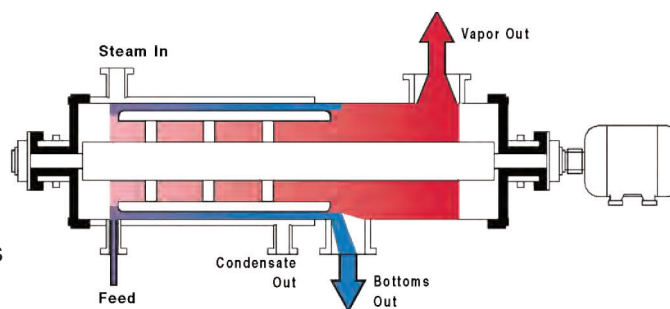


This film is constantly renewed, as the concentrated material is displaced towards the bottom discharge nozzle, by the incoming feed. As the residence time is generally measured in seconds, the degradation of heat sensitive materials is minimized.

As a reactor, multiple feed points, multiple temperature zones, controlled residence time and simultaneous evaporation, offer total flexibility for processing continuous reactions - **some powder applications can also be processed in a single step.**

### ADVANCE YOUR PURITY. INCREASE YOUR YIELD.

- Reduced degradation of heat sensitive materials
- Improved product quality
- Higher yields
- High viscosity capability (up to  $4 \times 10^6$  cP)
- Up to 99% evaporation in a single pass
- High turndown ratio (10:1)
- No dry spots or fouling
- Smaller heat transfer area required
- Easier installation
- Easier to maintain
- Co-current or counter-current operation
- Less solvent required for cleaning



#### Industries

- Chemical
- Food & Beverage
- Nutraceutical
- Oleochemical
- Petrochemical
- Oil & Gas
- Pharmaceutical
- Edible Oils
- Polymer

#### Applications

- Concentration
- Purification
- Dehydration
- Desolventization
- Aroma Recovery
- Deodorization
- Distillation



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## ADVANCE YOUR PURITY. INCREASE YOUR YIELD

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### Operating Principle

A screw barrel is integrated into the evaporator in-place of a conventional outlet nozzle. The barrel is oriented perpendicular, to the axis of the Rototherm®, and placed so that the screw is tangent to the rotor blades. A single screw, or self-cleaning, intermeshing twin screw is installed in the barrel. The screw device has its own variable speed drive motor and as the concentrated product reaches the discharge zone, the rotor blades push the product directly into the screw. The screw pushes the final product into a collection vessel or extrudes it through a die. The product itself can make a vacuum-to-atmosphere seal at the outlet of the screw. This allows to completely eliminate the potential for product build-up in the outlet. This is especially effective for materials that become sticky, viscous, tarry, and/or crust-forming as they are concentrated or dried.

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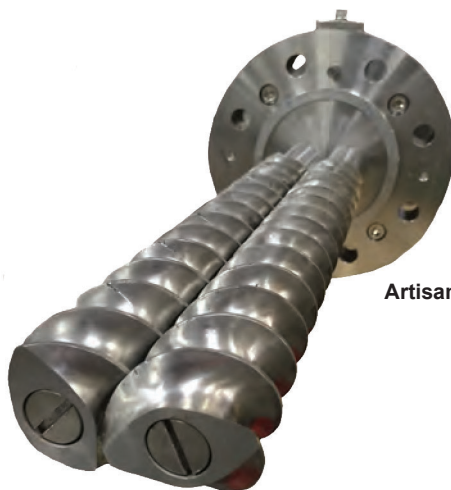
### *Process Technologies that Advance Thermal Separations.*

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#### Applications

- Concentration
- Purification
- Desolventization
- Aroma Recovery
- Aroma Extraction
- Deodorization
- Distillation
- Folding
- Drying



Artisan's Rototherm® Twin Screw





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### Process Technologies that Advance Thermal Separations.

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## Operating Principle

Strip residual volatiles from products that foam and moderate-to-low viscosity liquids. Artisan's Evaporator Stripper has the ability to operate at pressures below 1.0mm Hg absolute and to perform simultaneous heat and mass transfer, which enhances its stripping performance. It can be added to sparge gas to further increase stripping efficiency and has the advantages of no-moving parts, short residence time and multi-stage stripping.

The feed passes through a rising film evaporator to remove the bulk of the volatiles. The concentrated feed then cascades down over heated or unheated tube-and-disc trays where the remaining volatiles are stripped by the rising vapor.

The tube-and-disc trays provide a fresh liquid film at each stage giving new surface for evaporation and stripping. The extremely low pressure drop allows operation at very high vacuum. Stripping is accomplished at the lowest practical temperature as steam or nitrogen may be sparged into the column to further enhance mass transfer.

**Cost Effective Way of Reducing Volatiles in Heat-Sensitive Materials  
to PPM & PPB Levels.**

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- Chemical
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- Nutraceutical
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- Petrochemical
- Oil & Gas
- Pharmaceutical
- Edible Oils
- Polymer

#### Applications

- Concentration
- Purification
- Desolventization
- Aroma Recovery
- Aroma Extraction
- Deodorization
- Distillation
- Folding
- Drying

## Advantages



- Short residence time minimizes fouling, degradation and discoloration of heat-sensitive products.
- Multiple stages strip volatiles to low ppm or ppb levels in one pass  
High turn-down of up to 10:1
- No moving parts
- Constantly maintains film on the trays with repeated liquid distribution, overcoming a major shortcoming of conventional falling-film evaporators.
- Can operate at a very low pressure (<1 mmHg absolute).
- Self- draining, unobstructed disc-and-tube design handles viscous (up to 8,000 cP), solids-containing and foaming materials.
- Low product hold-up and self-draining design allow for easy CIP & multi-product use.

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## Your Source for Engineered Process Vacuum Systems

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Our vacuum technology provides safe, efficient, cost effective, and turn-key solutions, throughout multiple industries. **JET-VAC® Technologies** has created a proactive and responsive approach for customers who are faced with a process vacuum need.

### High Performance, High Quality

Our simple design and construction offers another significant advantage over other vacuum sources. Driven by steam or other motive liquids, **JET-VAC®** offers the lowest capital and operating costs of any vacuum source on the market today.

**JET-VAC® Technologies** offer unparalleled service and support to our customers. Our team of service professionals are available to assist you, whether your need is an original design specification, installation, operation & maintenance manuals (IOM), or help troubleshooting your system.

If you need ejector or condenser replacement parts, our professionals can assist you in selecting the parts you need and will ship them quickly to help keep your plant operating.

### Advantages of JET-VAC® Technologies Jet Ejector Systems

- Interchangeable Components in Corrosive-Resistant Materials
- Needs Only Process, Utility & Structural Connections
- Hybrid Steam Jet Vacuum Systems
- Interchangeable\* Materials of Construction (M.O.C.)
- Single & Multi-Stage Ejector Systems
- Low Initial & Ownership Costs
- Readily Available Spare Parts
- Reliable & Proven Technology
- Component or Skid Systems
- Nearly Maintenance Free
- Deep Design Vacuum
- Quiet & Compact
- Design Flexibility
- Long Service Life
- No Lubricating Oil
- Quick Delivery



#### Applications:

- Evaporation
- Stripping
- Distillation
- Evacuating
- Drying
- Chilling
- Degassing

#### Industries

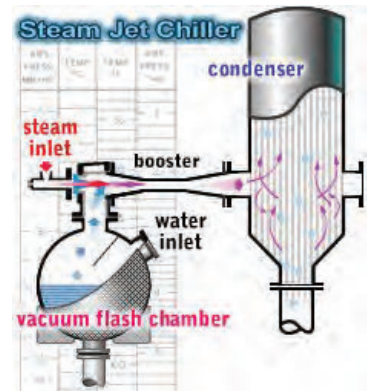
- Chemical
- Food & Beverage
- Nutraceutical
- Oleochemical
- Petrochemical
- Oil & Gas
- Pharmaceutical
- Edible Oils
- Polymers
- Flavors & Fragrances
- Power Generation
- Refineries



## Advantages of JET-VAC® Technologies Steam Jet Chillers



- No electricity required (except when designed with liquid ring vacuum pump)
- Low operating costs - can use waste or low cost steam
- Reduced facility cooling water temperature
- Few spare parts are needed in inventory
- Lower utility & maintenance costs
- Reliable - No moving parts
- No chemical refrigerants
- Minimize downtime
- Low noise



## We Can Make Your Engineered Solution Happen

### Post Sales Support

**JET-VAC® Technologies** has a team of service professionals available to assist you. With over 67 years of accurate records we can quickly respond and get you the answers you need.

### Maintenance & Spare Parts

Whether you require an original design specification, installation, operation & maintenance manuals (IOM), or troubleshooting for your system, we are ready to meet your needs. If you need ejector or condenser replacement parts, our professionals can assist you in selecting the parts you need and will ship them quickly to help keep your plant operating. We are ready to assist you on any vacuum system even if not originally manufactured by **JET-VAC® Technologies**.

If you haven't replaced the nozzle or diffuser, there is a good chance your vacuum system is under-performing.

### System Assessment & Upgrades

If your process has changed and your existing system is under-performing, we will assess your system to meet today's requirements and will recommend replacement parts to upgrade it for peak performance. In most cases, we service all jet equipment regardless of manufacturer.



### Training & Field Support

If you need training for your engineering, operating, and maintenance personnel we can provide an onsite training seminar to give the fundamentals of steam jet vacuum systems including troubleshooting.

## Prove & Optimize Your Results.



### Adding Value to Your Process

For over 85 years, Artisan has been providing thermal process solutions for customers to enhance their processing needs. Our experienced engineers work closely with our customers to develop a customized solution for their application and provide support throughout the entire process.

Artisan has a fully integrated facility with an extensive range of engineering capabilities to support our customers in meeting their product and delivery requirements.

#### Testing includes:

- Customized system, fully assembled for your application
- Engineers and operators with expertise and experience working to optimize
- Demonstration of capabilities to scale-up the process with confidence
- Collect samples at optimum conditions for testing and verification

#### Pilot Plant Process Equipment Inventory:

- Artisan Rototherm® horizontally agitated thin-film evaporators: stainless steel units with ½ and 1 square feet of heat transfer area
- Artisan Evaporator/Stripper™: 2" inside tube diameter, 13-tray stainless steel modules that can be combined to as many as 52 disc & tube trays.
- Packed Columns: 4" to 6" diameter stainless steel columns with up to 12 feet of packing. A variety of structured packing is available for up to 40 theoretical stages.

#### Industries

- Chemical
- Food & Beverage
- Nutraceutical
- Oleochemical
- Petrochemical
- Oil & Gas
- Pharmaceutical
- Edible Oils
- Polymer

#### Applications

- Concentration/ Extraction (Liquid/ Solid)
- Purification
- Desolventization
- Aroma Recovery
- Aroma Extraction
- Deodorization
- Distillation (Deep Vacuum)
- Folding
- Evaporation (Heat/ Shear Sensitive)
- Diffusion Drying

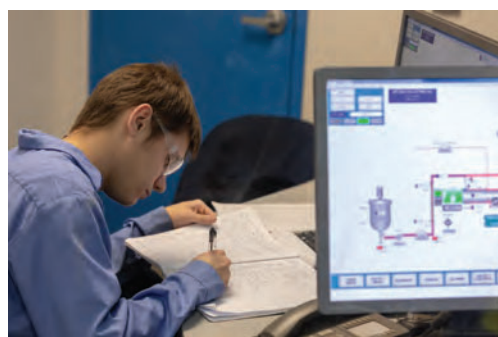




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## Pilot Plant Capabilities

- Continuous Process throughputs from 10 to 500 lb/hr
- Heat transfer medium: Hot water, steam and hot oil available, up to 650 °F
- Chilling down to 30 °F
- Vacuum to 0.1 mm Hg absolute
- VFD's for precise motor control of pumps and other process equipment
- 60 gallon agitated feed tanks/reactors
- Various pumps including progressive cavity, gear, diaphragm, centrifugal and peristaltic for handling a wide range of fluid types
- Opto 22 control system with direct and cascade controlling capabilities, Real-time Data acquisition and logging of over 50 process variables in a single setup.
- Analytical Lab: Karl Fisher Titrator, moisture analyzer, precision balances, fume hood and common laboratory glassware onsite for use during pilot trials, Laboratory space available for onsite analytical testing, including gases and connections for GC and HPLC instruments.



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## Related Services

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### Process Development, Engineering & Support

Artisan provides best-in-industry, experienced chemical engineers who will work with you to develop a customized solution for your application and provide support throughout the process.

### Custom Manufacturing

Artisan has a 110,000 sq. ft., fully integrated production facility with an extensive range of engineering, welding, manufacturing, machining, and assembly capabilities to support our customers in meeting their product and delivery requirements.

### Feasibility & Pilot Testing

We operate one of the most comprehensive pilot test facilities in the industry. Custom configured single or multi-staged systems are designed for your specific process. Whether you need to pilot a new process or improve an existing one, our experienced engineers will work with you to develop a cost effective solution to give you the competitive edge.



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## **We Engineer Thermal Solutions, You Inspire the Process.**



### **Process Development & Engineering Support**

For over 85 years, Artisan has been providing thermal process solutions for customers to enhance their processing needs. Our experienced engineers work closely with our customers to develop a customized solution for their application and provides support throughout the entire process.

Artisan has a fully integrated facility with an extensive range of engineering, welding, manufacturing, machining, and assembly capabilities to support our customers in meeting their product and delivery requirements.

We operate an on-site pilot plant testing facility with custom configured, single or multi-staged, systems that confirms Artisan's solutions to customers on a small-scale deliverable. Whether you need to engineer a new or improve an existing process, our engineers will work within guidelines to develop a cost-effective solution to give you the competitive edge.

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## **Eliminate Process Steps. Reduce Waste. Increase Profitability.**

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Artisan Engineers select the optimal thermal process solution for your application need. Standard sizes include 1,5,10, 15, 20, 30, 40, 50, and 60 sq. ft. as well as custom sizes available. The heating medium can be steam or hot oil and materials of construction include stainless steel (300 series & Duplex), carbon steel, nickel, Inconel®, Monel®, Hastelloy, and titanium.

Artisan is the holder of three certificates of authorization, issued by ASME, and The National Board of Boiler & Pressure Vessels Inspectors. Artisan has experience in design and manufacturing to meet standards in over 35 countries, including CSA B51, DOSH, GOST-R, and JIS-MOL.

We are able to certify pressure vessel requirements of China, Korea, Japan, Russia, and Europe as well as many other countries around the world.