

# Engineering Value Through **Tubing Innovation**

Benefit by utilizing the most advanced stainless steel and titanium tubing in your heat transfer systems—make them safer and more productive.

Vipertex® advanced tubing has been developed through a partnership of New World Stainless and Rigidized® Metals Corporation, and has been designed and engineered to deliver optimized performance in heat transfer and fluid conveyance applications. The key is increased surface area coupled with optimized flow patterns and anti-fouling characteristics.

Choose from singular or dual designs with micro textures and/or deep-texture patterns to facilitate dramatic improvements in condensation and evaporation. Customized solutions are available to meet your requirements. Benefits include up to five times the heat transfer when compared to smooth tubing.

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**5X**  
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**Vipertex**®  
ENHANCED METAL SURFACES  
BY NEW WORLD STAINLESS

# A Revolutionary Manufacturing Technology

Vipertex® tubing is produced to the ASTM A1098 specification using a patented enhancement process, resulting in surfaces that outperform standard smooth tubes.

## Design Considerations

### Operating Conditions

Heat exchangers using Vipertex® tubes and/or flat goods can be substantially more efficient than those produced with conventional materials. Various operating conditions need to be considered so that the improvements achievable through Vipertex® utilization can be determined and optimal strategies can be identified to guide final design decisions.

### Pressure Applications

Vipertex® tubes can be applied to exchangers operating at various pressure levels. Different alloy systems, wall thicknesses and processing specifications contribute to the achievement of certain desired pressure ratings. Burst and collapse pressure tests of welded Vipertex® tubes confirm higher ratings than their smooth, welded tube counterparts.

### Flow Rate

Vipertex® optimal performances show a heat transfer improvement in excess of 500% with a Reynolds number near 1000. At other flow rates, performance enhancement values of 90-100% are typically seen, depending on pattern selection. It should be noted that the smaller units with relatively lower pressure drops will reduce pumping power requirements and associated operating costs, thereby providing significant savings.

### Two Phase Applications

Vipertex® tubes work extraordinarily well in single phase processes, but also enhance two phase applications. Vipertex® is available in various surface texture options that are excellent choices for condensers and evaporators. This is seen through drainage channel creation and establishment of nucleation sites, respectively.

### Fouling

Vipertex® enhanced surfaces have anti-fouling characteristics that are beneficial in many conditions. The design of the Vipertex® surface produces a wall shear that cleans the tube surface, allowing less debris to accumulate on the surface. Surface tension is minimized by the addition of 3- dimensional surfaces. For many applications where fouling is a concern, Vipertex® designs yield more heat transfer than other smooth or certain enhanced tubes.

### Charging Requirements

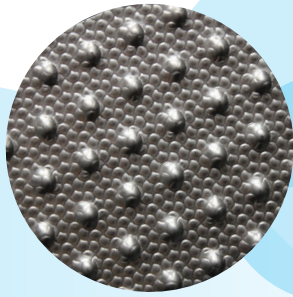
The increased thermal efficiency of a Vipertex® installation reduces the amount of charging substance required, which provides the following benefits:

- Minimized charge volumes
- Greatly decreased environmental risks
- Reduced space requirements

Optimized heat transfer, using the Vipertex® 1EHT (Enhanced Heat Transfer) tubes, is realized via a combination of secondary flow generation, increased turbulence, boundary layer disruption, increased heat transfer surface area and an increased surface irregularities; all leading to an enhanced heat transfer performance for a wide range of operating conditions.

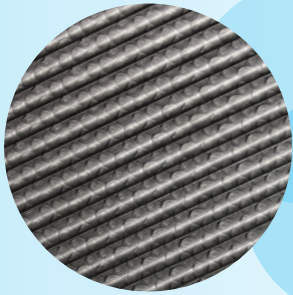
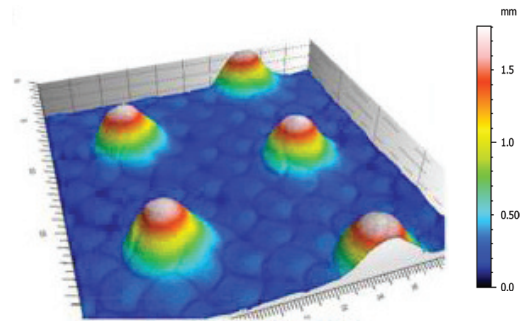
In many environments, the Vipertex® EHT tubing line can recover more energy and provide the opportunity to advance the design of many heat transfer products. Enhanced heat transfer tubes are widely used in order to reduce operating cost and create a smaller installation footprint.

Vipertex<sup>®</sup> enhanced surfaces can be applied to one or both sides of the surface. Here are four examples of the many patterns available:



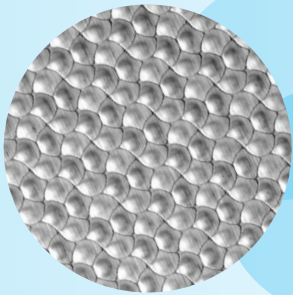
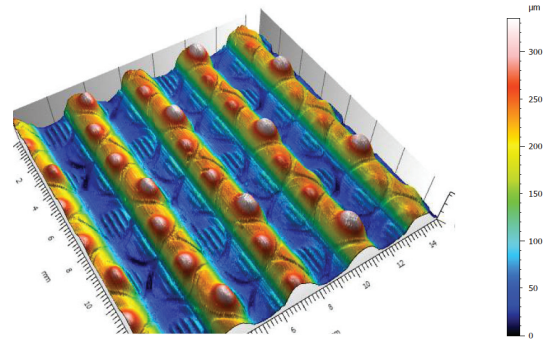
## 1EHT

The most researched pattern available, HTC improvements can be realized up to 5x that of smooth tubing.



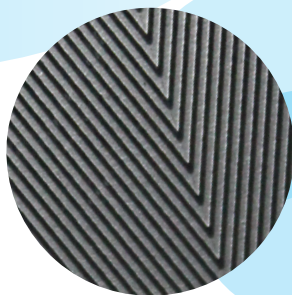
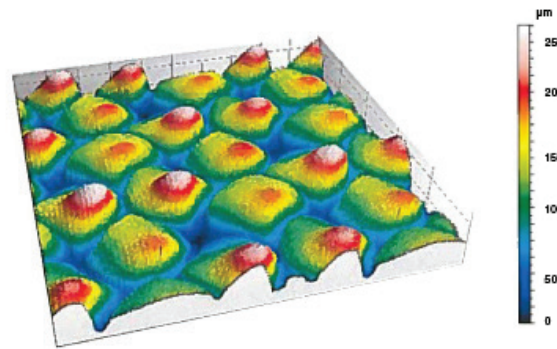
## 2EHT

The 2EHT line is intended to provide HTC improvements with a smooth OD that can be finned.



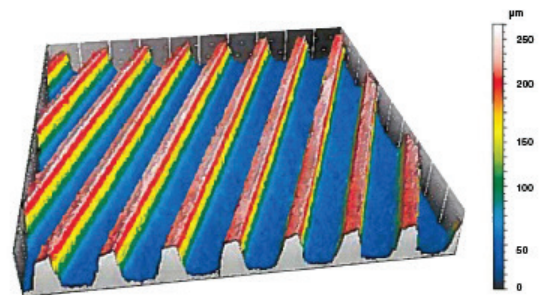
## 3EHT

This design is typically utilized where the desired structural improvement is increased surface area.



## HX/EHT & HB/EHT

Microfin structures increase surface area and provide channels for improved fluid conveyance.



- + An add-in suite for the HTRI software program is available to aid in system modeling.
- + Also available are Vipertex<sup>®</sup> multipliers that can be used with Aspen design software.

## FEATURES

- Increased surface area for more efficient heat transfer
- Improved nucleation sites for quicker and easier evaporation
- Amplified turbulence to minimize laminar flow
- Upgraded anti-fouling characteristics to increase optimal performance lifespan
- Augmented drainage features to improve condensation
- Enhanced thermal transfer per unit length

## BENEFITS

- Minimized unit size
- Lower charging fluid requirements
- Improved unit efficiency
- Decreased capital expenditures
- Reduced operating costs
- Smaller footprint

## Available Materials & Alloys

Stainless steel, nickel alloy, and titanium tubing is available as straight lengths or in one of several coil configurations. Tubing can be 'welded to size' or 'welded and drawn tubing', and can also be manufactured with enhanced properties.

## TIG Welded Tubular Products

- 304/304L, 316/316L, 321, 2205, 825, 625, C276, and Titanium
- ASTM A1098
- 1/16" to 1" O.D.
- 0.010" to 0.083" wall
- Welded to size, welded and drawn
- Orbital welding, spooling, and straightening
- Long length coils (35,000 ft +) and precision cut straight lengths
- Tubing is fully annealed unless otherwise specified
- Product available in stick or custom coil configurations
- Flat rolled enhanced steel available for turbulators or twisted tape

For information about other alloy systems in tubing and flat rolled configurations, visit [vipertex.com](http://vipertex.com)

Vipertex® advanced tubing has been designed, engineered and manufactured through a partnership of New World Stainless and Rigidized® Metals Corporation.



### New World Stainless

An American manufacturer of precision-welded tubing that delivers reliable performance in applications requiring high pressure tolerance and enhanced corrosion resistance. NWS sets the bar in premium stainless and titanium pressure tubing.

### Rigidized® Metals Corporation

Leading the world in the development and production of deep-textured, engineered metal surfaces used in a variety of applications. Our deep-texturing process adds strength and resiliency, and results in lighter, longer-lasting products and reduced maintenance costs. Please visit [rigidized.com](http://rigidized.com) for alternatives to stainless and titanium tubing.

Visit [newworldstainless.com/vipertex](http://newworldstainless.com/vipertex) to learn more, or contact us to discuss how Vipertex® tubing can benefit your operations.

Phone: 732.412.7141 Email: [info@nwstube.com](mailto:info@nwstube.com)

