Heat Exchanger Tubes
Quality and safety

We provide the highest level of quality and safety. This level is guaranteed by our stringent control procedures and unchallenged technical experience. Every tube leaving our facilities is controlled, safe and traceable. Our best testimony of product quality is our long list of references worldwide.

Innovation

Combining our force with the Vallourec Group, our R&D teams develop ambitious innovation and research programs to enhance the performance of our tubes in the toughest environments.

Premium at heart

Our offer is based on an exclusive relationship and dialogue with our clients: every order is tailored to meet all its requirements. Our premium offers include a variety of specifications and services all along the value chain.

Close to market

You can rely on our local sales force and our worldwide factory network in 5 countries on 3 continents.
Markets

**Tubes for every heat exchanger**

We supply welded tubes for heat exchangers in powergen (nuclear and thermal), desalination and process applications. Our high-performance welded tubes are used in Condensers, high-pressure and low-pressure FeedWater Heaters as well as MSRs (moisture separator steam reheat exchangers).

**Tough, reliable and durable**

Vallourec Heat Exchanger Tubes has extended its expertise to high-performance products for the harshest environments. We can provide tubes that sustain seawater, brackish water or corrosive products with outstanding durability and reliability.

Our tubes in power plant applications

**Nuclear Power Plant**

**Thermal Power Plant**

World leader in powergen desalination & process

- More than 500 power plants delivered
- More than 160 nuclear MSRs delivered
- More than 20 LNG trains
- More than 90 desalination plants delivered
Vallourec Heat Exchanger Tubes provides a wide range of grades and sizes: titanium, austenitic stainless steel, ferritic stainless steel (TP439 used for MSR and FWH HP) and super stainless steel. Our tubes can be straight, bent, smooth, finned or corrugated. Each order is unique and every tube delivered has been defined, designed, produced, inspected and packaged.

The weld: a proven reliability
Tube welding technology guarantees the best dimensional characteristics for your tubes. The thickness is constant and high performance thin walls are possible. The diameter and weld bead thickness are always under control as well as every metallurgical characteristic.
Titanium

**The superior solution**

Titanium is becoming the most efficient and cost-effective material for an increasing number of applications. It offers unmatched corrosion resistance combined with high mechanical properties. Moreover, our titanium welded tubes can be manufactured in very thin-wall gauges saving both on cost and weight.

**Titanium experts**

World leader in titanium tubes, Vallourec Heat Exchanger Tubes has the experience and expertise to bring the highest level of technical assistance, to help integrate titanium tubes within customer’s design. In addition we have secured access to superior titanium strip, with a capacity to meet the needs of the market.

Proven reliability

Zero corrosion
Manufacturing process

Expert manufacturing process

Tube mill strip is uncoiled and fed through a multiple stand forming mill which shapes the strip into a tube. The tube is welded without filler metal in an inert atmosphere using a non-consumable tungsten electrode (T.I.G. welding) or laser technology. Dimensional properties are achieved when the as-welded tube passes through a final, multi-stage sizing mill. Mechanical and thermal stresses are relieved by in-line induction heating under inert atmosphere. Afterwards, the tube is straightened, 100% Eddy Current (EC) tested, line marked, then automatically cut. Finished tube ends are deburred. The product is subsequently dimensionally inspected, tested through NDT controls (pneumatic testing, EC inspection and Ultrasonic Testing) and packaged to customer specification.

Excellence in every plant

Our manufacturing process is designed to guarantee the highest level of quality and safety for tubes, in accordance with customer specifications, and beyond. We believe in constantly improving our factories and production methods. Our equipment is state-of-the-art and we implement stringent maintenance procedures to ensure the highest quality of every tube coming off of our lines. Every Vallourec Heat Exchanger Tubes factory shares the same values and practices, ensuring the same excellence everywhere, both in the production process and plant management.
Process control

Mastering the process control

With over 30 years of experience and continuous progress Vallourec Heat Exchanger Tubes masters the entire welding process and provides the highest level of quality and safety in the market.

Non Destructive Testing (NDT)

NDT is at the heart of our quality process and is the result of an unmatched experience of welded tubing solutions. Vallourec Heat Exchanger Tubes has always been a pioneer in NDT and provides high-end controls including ultrasonic, Eddy Current, pneumatic and hydraulic testings.

Leaders in ultrasonic testing

Vallourec Heat Exchanger Tubes was the first company in the world to develop ultrasonic testing on welded tubes, as early as in 1977, exceeding the ASTM B 338 standard that only required Eddy Current inspection. Thanks to our research team, we have improved the ultrasonic testing on welded tubes and can offer it as standard for all demanding customer.

Certified quality and safety

EDDY CURRENT TESTING
ULTRASONIC TESTING
PNEUMATIC TESTING AIR/AIR
PNEUMATIC TESTING AIR-UNDER WATER
HYDRAULIC TESTING
Vallourec endeavors to develop research and create innovative solutions for its customers with the combined power of the Vallourec group and its own research facilities.

Our R&D teams deploy extensive research programs in two directions:

- To enhance the performance and longevity of our tubes in the toughest environments.
- To optimize the production process, including non-destructive testing methods and premium packaging solutions.

We seek to design and produce uniquely tailored products for the most demanding applications in the world. Our most qualified engineers and experts are here for you: feel free to share your technical challenge with us!

Vallourec Heat Exchanger Tubes constantly develops its technology to procure thinner wall and enhanced surface tube. Finning and corrugation improve heat transfer and lower cost and size of the heat exchanger.

We provide for example Valfin®, ferritic finned tubes specially designed for MSR. The ferritic material, TP439 is best suited for the high temperature of the MSR. The finning can increase surface exchange area by at least 3 times.

We also provide Fine-Fin®, a finned tubular solution which yields numerous benefits for shell and tube heat exchangers including reduced size and cost for new equipment, increased performance of existing equipment, and availability in corrosion resistant materials such as titanium and duplex stainless steel.

Innovation

The power of Vallourec research

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Vallourec Heat Exchanger Tubes assists its customers in a creative way to support their most critical projects. We can help design a project and recommend the most adapted technical specifications and best available services. For example, we can offer exclusive services through long-term agreements and collaborative planning: secure price and availability of raw material, optimize logistics or deliver production flexibility. In other instances, for your most demanding projects (long tubes, stringent transport and storage conditions or specific tube installation), we can develop and produce customized packaging solutions.

Our ultimate goal is to deliver you the best service to lower your total cost of ownership.

**Creative solutions**

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**Exclusive Valpack® offer**

On-site operations are tricky and involve a great number of teams and operators. We can make your life easier: ask about our on-site services. We can ease and secure deliveries and supervise handling, tubing and retubing operations. Vallourec Heat Exchanger Tubes can bring you unmatched on-site assistance for optimal quality. Our services are tailored to your every specific need.

**Premium service**

**Optimized logistics**
**Packaging solutions**
**On-site technical assistance**
**Typical standards and materials**

<table>
<thead>
<tr>
<th>Standards</th>
<th>Applications</th>
<th>Typical chemical requirements in % according to ASTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP 317LMN</td>
<td>Heat resistant</td>
<td>TP 317L (S31703) 1.4438 317 L X</td>
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<td>TP 317L</td>
<td></td>
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<tr>
<td>TP 316L</td>
<td></td>
<td>(S31803)</td>
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<tr>
<td>C 44300</td>
<td></td>
<td>VALLOUREC STAINLESS STEELS</td>
</tr>
<tr>
<td>Heat Exchanger Tubes</td>
<td></td>
<td>Standards Applications Typical chemical requirements in % according to ASTM Tubing Typical Tensile Strength Requirements (ksi)</td>
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**Typical Yield strength 0.2% of at high temperature (ksi - min) - 105 °F - 1000 °F**

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</table>
Titanium and Stainless Steel Welded Tubes

Diameter and Wall Thickness Capabilities

Titanium Alloys
- 12.7 mm ≤ OD ≤ 73 mm
- 3.05 mm ≤ WT ≤ 3.77 mm

Stainless Steels
- 12.7 mm ≤ OD ≤ 46.2 mm
- 0.5 mm ≤ WT ≤ 2.77 mm

Other dimensions can be considered upon request.

Length and Bending Capabilities

<table>
<thead>
<tr>
<th>MAXIMUM AVAILABLE LENGTH</th>
<th>BENDING CAPABILITIES</th>
<th>TUBE OUT-OF-ROUNDNESS IN THE BENT PART</th>
</tr>
</thead>
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<td>For straight tubes: 25 m - 82 ft</td>
<td>R min = 1.5 OD for 7.5 ≤ OD/WT &lt; 30</td>
<td>8.5% maxi for R ≥ 100 mm 10.5% maxi for 2 x OD ≤ R &lt; 100 mm</td>
</tr>
<tr>
<td>For bent tubes: Development: 42 m - 151 ft</td>
<td>OD x (0.17 OD/WT - 3.5) for 30 ≤ OD/WT ≤ 39</td>
<td>12.5% maxi for 1.5 x OD &lt; R &lt; 2 x OD</td>
</tr>
</tbody>
</table>

ValBrite™ Premium Stainless Steel Welded Tube Solution for Brackish and Sea Water

ValBrite™ production lines are specifically designed for welding superferritic, superaustenitic and superduplex stainless steel tubing. The advanced use of TIG or laser welding in combination with the bright annealing process and stringent NDE testing insure the highest quality and reliability of ValBrite™.

ValBrite™ tubes are eddy current and air pressure differential tested. Ultrasonic testing is available as a recommended option.

A specific ValBrite™ datasheet is available upon request.

Valfin® Integrally Finned Welded Tubes Grades 439 L

Valfin® 19 ± 1.0 FINS / INCH Height of fin h: 1.5 mm - 0.059 in ± 10%
Thickness at 1/2 height: 0.366 mm - 0.014 in ± 10%

Valfin® 27 ± 1.0 FINS / INCH Height of fin h: 1.27 mm - 0.050 in ± 10%
Thickness at 1/2 height: 0.292 mm - 0.011 in ± 10%

Other dimensions and profiles can be manufactured upon request.
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