Advanced technology, experience consolidated over the years, the constant search for quality, flexibility and customer service, are the strong points of Arvedi Tubi Acciaio S.p.A., a leader in welded tubes for special applications.

With a production capacity of over 600,000 tpy and a turnover of €400 million, constantly rising, the Cremona-based company holds a considerable share of the market in the automotive, mechanical engineering, thermal applications, plant and construction sectors.

Its stretch-reducing mill and ERW production lines, fitted with the most advanced automation technology, allow customers to be offered a vast range of products that can meet the strictest requirements and standards.

Arvedi Tubi Acciaio Ltda (San Paolo - Brazil) specialised in the production and cold drawing of carbon steel welded tubes.

www.arvedi.it
## TUBE MANUFACTURING PROGRAMME

<table>
<thead>
<tr>
<th>WALL THICKNESS (mm)</th>
<th>Ø OD</th>
<th>1.2</th>
<th>1.5</th>
<th>2.0</th>
<th>2.5</th>
<th>3.0</th>
<th>3.5</th>
<th>4.0</th>
<th>4.5</th>
<th>5.0</th>
<th>5.5</th>
<th>6.0</th>
<th>6.5</th>
<th>7.0</th>
<th>8.0</th>
<th>9.0</th>
<th>9.5</th>
<th>10.0</th>
<th>11.0</th>
<th>12.5</th>
<th>15.0</th>
<th>16.0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Hot rolled

- **EN 10296**: GSM-mechanical Welded steel tubes for mechanical applications
- **EN 10210-1/2**: GSM-structural Hot rolled welded tubes for structural applications

### Precision tube

- **EN 10305-3**: Precision applications Cold calibrated – precision - round welded steel tubes
- **EN 10296**: Cold mechanical Welded steel tubes for mechanical applications

### Hot finished structural

- **EN 10296**: Hot finished mechanical Welded steel tubes for general mechanical applications
- **EN 10210**: Hot finished structural Normalised welded tubes for structural applications
- **EN 10225**: Offshore hot structural Normalised welded tubes for offshore structural applications

### Cold-finished structural

- **EN 10219-3**: Cold structural Cold-formed welded tubes for structural applications
- **EN 10219-5**: Cold structural Square and rectangular cold-calibrated welded hollow sections
- **EN 30**: Cold structural Welded tubes for scaffolding/trestle structures
- **EN 10099**: Cold structural Welded tubes for road signs
- **ASTM A500**: Cold structural Cold-formed welded steel tubes for structural applications
- **ASTM A252**: Cold structural Welded steel tubes for pilings

### Energy & Power

- **EN 10217-1**: Pressure applications Welded steel tubes for pressure applications at ambient temperature
- **EN 10217-2**: Pressure applications Welded steel tubes for pressure applications at high temperature
- **EN 10217-3**: Pressure applications Welded tubes in low alloy steel for pressure applications
- **EN 10217-4**: Pressure applications Welded steel tubes for low temperature applications
- **ASTM A178**: Pressure applications Welded steel tubes for boilers and heat exchangers
- **ASTM A214**: Pressure applications Welded steel tubes for heat exchangers and condensers
- **EN 10235**: Gas and water thin-walled welded steel tubes for gas and water applications
- **UNI 1669**: Control Welded steel tubes for control piping and instrumentation
- **ASTM A53**: Pressure applications Black and hot-dip galvanized steel tubes
- **EN 10216-3 Hot pipe**: Welded steel tubes for combustion fuels (hot pipe)
- **API 5L**: Line pipe
- **EN 1024**: Line pipe Welded steel tubes for conveying liquids
- **EN 395**: District heating Welded tubes for district heating
- **API 5CT**: OCTG Tubes for petroleum applications – casing and tubing
- **API 5L**: OCTG Tubes for petroleum applications – casing and tubing

### Hot stretch reduced

- **EN 10296**: GSM-mechanical Welded steel tubes for mechanical applications
- **EN 10210-1/2**: GSM-structural Hot rolled welded tubes for structural applications

### Welded (cold formed as weld / seam annealed / hot finished)

- **EN 10305-3**: Precision applications Cold calibrated – precision - round welded steel tubes
- **EN 10296**: Cold mechanical Welded steel tubes for mechanical applications

### Standard application description

- **Hot rolled**: Standard application description
- **Precision tube**: Standard application description
- **Hot finished structural**: Standard application description
- **Cold-finished structural**: Standard application description
- **Energy & Power**: Standard application description

### Wall thickness

- **1.2**: 172
- **1.5**: 25.4
- **2.0**: 26.4-26.9-28.0
- **2.5**: 30.0-30.8-32.0
- **3.0**: 33.7
- **3.5**: 35.5
- **4.0**: 38.0-40.0
- **4.5**: 42.0-42.4
- **5.0**: 44.5-45.0
- **5.5**: 48.0-48.3
- **6.0**: 50.0-50.8-51.0
- **6.5**: 54.0-56.0-57.0
- **7.0**: 60.0-60.3
- **7.5**: 63.5-65.0
- **8.0**: 76.1
- **8.5**: 80.0-82.5
- **9.0**: 88.9-90.0
- **9.5**: 100-101.6
- **10.0**: 108.0
- **10.5**: 114.3-115
- **11.0**: 127.0
- **11.5**: 133.0
- **12.0**: 139.7
- **12.5**: 152.4
- **13.0**: 159.0
- **13.5**: 168.3
- **14.0**: 177.8
- **14.5**: 193.7
- **15.0**: 219.1
- **15.5**: 244.0
- **16.0**: 273.0
- **16.5**: 323.9
- **17.0**: 355.6

---

### Wall thickness (mm)

- **Hot stretch reduced**
- **Hot stretch reduced + welded (cold formed as weld / seam annealed / hot finished)**
- **Welded (cold formed as weld / seam annealed / hot finished)**
### Metric Sizes (mm)

<table>
<thead>
<tr>
<th>Square</th>
<th>4.0</th>
<th>4.5</th>
<th>5.0</th>
<th>6.0</th>
<th>8.0</th>
<th>10.0</th>
<th>12.5</th>
<th>14.2</th>
<th>16.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 x 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>120 x 80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>110 x 110</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>120 x 80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120 x 120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>150 x 100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>140 x 140</td>
<td></td>
<td>180 x 100</td>
<td></td>
<td></td>
<td></td>
<td>200 x 80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150 x 150</td>
<td>200 x 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200 x 120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>160 x 160</td>
<td>200 x 120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200 x 150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>180 x 180</td>
<td>200 x 150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200 x 180</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 x 200</td>
<td>200 x 200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200 x 200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>250 x 250</td>
<td>300 x 300</td>
<td>400 x 200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>300 x 300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Imperial Sizes (inches)

<table>
<thead>
<tr>
<th>Square</th>
<th>4.0</th>
<th>4.5</th>
<th>5.0</th>
<th>6.0</th>
<th>8.0</th>
<th>10.0</th>
<th>12.5</th>
<th>14.2</th>
<th>16.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; x 4&quot;</td>
<td>101.6 x 101.6</td>
<td>120 x 80</td>
<td></td>
<td></td>
<td></td>
<td>120 x 100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.5&quot; x 4.5&quot;</td>
<td>114.3 x 114.3</td>
<td>140 x 80</td>
<td></td>
<td></td>
<td></td>
<td>152.4 x 101.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5&quot; x 5&quot;</td>
<td>127 x 127</td>
<td>160 x 80</td>
<td></td>
<td></td>
<td></td>
<td>152.4 x 127</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1/2&quot; x 5.1/2&quot;</td>
<td>199.7 x 199.7</td>
<td>180 x 100</td>
<td>200 x 80</td>
<td></td>
<td></td>
<td>177.8 x 127</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot; x 6&quot;</td>
<td>152.4 x 152.4</td>
<td>200 x 100</td>
<td>200 x 120</td>
<td></td>
<td></td>
<td>203.2 x 127</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1/2&quot; x 6.1/2&quot;</td>
<td>230 x 230</td>
<td>200 x 150</td>
<td>250 x 100</td>
<td></td>
<td></td>
<td>203.2 x 127</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7&quot; x 7&quot;</td>
<td>177.8 x 177.8</td>
<td>250 x 150</td>
<td>250 x 180</td>
<td></td>
<td></td>
<td>241.3 x 127</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8&quot; x 8&quot;</td>
<td>203.2 x 203.2</td>
<td>300 x 150</td>
<td>300 x 200</td>
<td></td>
<td></td>
<td>254 x 127</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10&quot; x 10&quot;</td>
<td>254 x 254</td>
<td>400 x 200</td>
<td></td>
<td></td>
<td></td>
<td>304.8 x 127</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Arvedi Cold Formed Hollow Sections

With the start-up of Line 12, and the subsequent expansion of the production range, the Arvedi manufacturing programme for cold-formed round tubes widened to a diameter of 355.6 mm and wall thickness of up to 16 mm; the production of square hollow sections in the range from 100x100 to 300x300 mm and rectangular ones from 120x80 to 400x200 mm with wall thickness from 4 to 16 mm was also added to the production of circular sections.

These tubes are used in a wide variety of applications and in particular in the structures of civil and industrial buildings.

Arvedi cold-formed round, square and rectangular structural tubes are high-frequency induction-welded and made in the European formats provided by standard EN10219-1/2 and American formats (imperial sizes) in conformance with standard ASTM A500.
THE ARVEDI HOT FINISHED

The perfection of cold formed with all the benefits of hot finished
Arvedi hot-finished round, square and rectangular structural tubes are high-frequency induction-welded tubes made in accordance with standard EN10210-1/2.

Arvedi hot finished structural tubes, as well as the special features of cold-formed welded tubes, such as:
• precision, control and uniformity of geometry and dimensions
• absence of eccentricity
• close tolerances on wall thickness
• precision of the corner radius
• excellent surface finishing, both in terms of absolute roughness and surface scale
• in line with the prescriptions of standard EN 10163-3 class D, subclass 3

have all the benefits of hot finished tubes, such as:
• homogeneity of the technical characteristics: workability, weldability, ductility, plasticity and bendability
• absence of tensions in the section edge areas and the tube welding area
• suitability for welding on the edges of the whole Arvedi size range, overcoming the limits defined in Eurocode 3 (also for wall thicknesses >12.5 mm).

Arvedi Hot Finished tubes, compared to those of some of our rivals, thanks to the type of heat treatment carried out – full body normalising (with temperature above the Ac3 austenitising temperature):
• are optimal for use in building steel structures in seismic areas since they fully comply with the prescriptions of the Ministerial Decree relative to construction products (point 11.3.4.9)
• thanks to their extensive plastic range they have a large capacity to absorb energy, a characteristic which makes them ideal for constructions, structures, plants and machinery subject to sudden loads, repeated loads, fatigue and vibrations;
• are ideal for curving and bending and generally present a high level of workability.

Moreover, Arvedi Hot Finished tubes, compared to our best rivals, also add:
• control of the position of the internal welding bead, always at the centre of the larger side, (optionally) removal of the internal welding bead, the same thickness on the sides and edges of the section;
• uniform wall thickness and weight along the whole length of the single tube or hollow section and no differences between one and another;
• customizable sizes and lengths

Competitiveness
Leonardo allows prefabricated structures to be obtained and finished directly in the construction sites; the metal structures are easy to transport and simple to install and are also easy for constructing large civil, industrial and public structures in short times with low maintenance costs.

Safety and durability
Leonardo’s static and dynamic behaviour is excellent and, being hot finished, has a high plastic range. The structures made with Leonardo are fail-safe: able to sustain vibrations, unexpected loads and seismic events, absorbing energy and deforming without breaking. Durability can be guaranteed by the use of steel with improved characteristics against atmospheric corrosion (Corten) or by galvanizing and painting.

Sustainability and efficiency
Leonardo is 100% recyclable. Leonardo, produced with steel from the Acciaieria Arvedi, a steelworks which produces steel from scrap using an innovative process, has a much smaller carbon footprint than Hot Finished Hollow Sections and or Hot Finished Hollow Sections produced from integrated-cycle steel.

Certified steel
Leonardo Hot Finished Hollow Sections are made in accordance with standard EN10210 and are CE certified in compliance with the European Directive on Buildings 305/11.
Arvedi hot rolled tubes (Arvedi LC® and GSM®) are produced on the hot stretch-reducing mill, a unique plant that allows small and medium/small-diameter tubes to be obtained with the internal bead removed, even those with thick walls in the normalised state. The production cycle, starting from hot rolled strip, foresees forming, HFI welding and removal of the internal bead of the “mother shell” which is subsequently heated in an induction heater and hot rolled on the stretch-reducing mill. The excellent degree of workability, appreciated by users of Arvedi LC® tube, is the result of a controlled hot reduction process which, besides supplying the tube in the normalised state, guarantees complete homogeneity of the material’s mechanical and physical characteristics.

Arvedi LC® tubes
Arvedi LC® is the Arvedi trademark identifying the production of tubes and pipes for the plumbing and heating sector obtained with a hot rolling process. These tubes and pipes, in compliance with standard EN 10255, are used for plumbing and heating plants. After the production process these tubes and pipes are hot-dip galvanised using SHG lead-free zinc with a high degree of purity. Arvedi LC® tubes can be supplied with the following ends:
- plain, square cut and bevelled
- threaded with EN 10226-1 threading and with coupling in compliance with standard EN 10241 screwed onto one end
- grooved: suitable for using “Vitaulic”-type screwed couplings

Arvedi GSM® tube
The characteristics of homogeneity and workability of Arvedi LC® tube are enhanced in the heavy wall mechanical tubes (GSM®) where the ratio between wall thickness and diameter is pushed to ratios of over 30%. The peculiarity of the Arvedi process, with rolling of a mother shell not obtained through drilling but through welding starting from a strip with limited thickness variations and the use of a stretch-reducing mill with individually motorised stands, guarantees that tubes are obtained with superior geometrical characteristics, negligible eccentricity and limited internal polygonality.
ARVEDI PRECISION TUBES

Welded Precision Tubes
Starting from steel strips, produced by Acciaieria Arvedi, which guarantee constant mechanical characteristics and close wall thickness tolerances, ATA produces high frequency induction welded (HFI) precision tubes in conformance with standard EN 10305-3 and in accordance with customer specifications. These tubes, which have the most stringent prescriptions on dimensional tolerances are often processed with deep deformations and the obtained finished products are then frequently subjected to occasional or continuous fatigue stress. Industrial plant parts, machinery such as rolls, moving structures and crane parts are examples of their applications.

ARVEDI AUTOMOTIVE TUBES

The high frequency induction welded (HFI) precision tubes produced by ATA in conformance with standard EN 10305-3 and/or in accordance with customer specifications are used in the car and truck components sector. Arvedi Tubi Acciaio is an appreciated supplier of the leading car manufacturers and their subcontractors.

Mother shells for drawing ARVEDI mother shells for cold drawing represent ATA’s core business where it is the leading European company and the only independent supplier of these products. These tubes can be produced as hot stretch-reduced and welded, and rolled from cold welded black or pickled strip, to standards EN 10305-3, EN 10210, EN 10296 or to customer specifications; they are made in a wide range of steel grades and in the full size range of diameters from 17 to 355.6 mm and wall thicknesses from 1.5 to 16 mm. ARVEDI mother shells for drawing are suitable for cold drawing to obtain tubes with close tolerances and low roughness used in particular in the automotive sector and cylinder industry.

ARVEDI BOILER TUBES AND HEAT EXCHANGERS

The excellent final characteristics are achieved using raw materials of constant and uniform quality from Acciaieria Arvedi and ATA’s special production equipment which allows close dimensional tolerances to be respected. The results are better workability and repeatability in the welding, rolling expansion and curving phases. These tubes are mainly used in industrial and domestic boilers, high and low temperature heat exchangers and in applications for the conveyance of pressurised fluids in the chemical and petrochemical industries.

The reference standards are:
- EN 10217-1 for uses at ambient temperature
- EN 10217-2 for uses at high temperatures
- EN 10217-3 for fine grain alloyed tubes
- EN 10217-4 for uses at low temperatures

ASTM A214 electrically welded carbon steel heat exchangers and condensers
ASTM A178 electrically welded carbon steel tubes for boilers and heat exchangers

The tubes for pressure applications can be supplied in lengths up to 15 metres and in the following states:
- welded and calibrated
- normalised along the weld area
- normalised in a controlled atmosphere
- hot rolled

On request, in the order phase, it can be agreed to supply the tubes by completing the product documentation with PED (pressure equipment directive) certification in conformance with the requirements of European Directive 97/23/EC and/or AD 2000 TKD 102/ABW4 certification.

ARVEDI DISTRICT HEATING

Arvedi produces and supplies tubes for district heating in line with the provisions of standard EN255 and stringent customer specifications.

ARVEDI line pipes for district heating are welded tubes produced in accordance with the series of standards EN 10224 and can be supplied seam annealed or full body normalised, they are made in steel grades provided by the standards or in special steel grades in accordance with customer specifications and ensure use in extreme conditions; depending on the application requirements the ARVEDI line pipes can be supplied in lengths ranging from 6 to 16 metres. As completion of production documentation Arvedi Tubi Acciaio can provide PED (pressure equipment directive) certification in conformance with the requirements of European Directive 97/23/EC.

ARVEDI WATER PIPE

Arvedi Tubi Acciaio uses high quality carbon steels characterised by excellent physical and mechanical properties. The repeatability of these characteristics allows tubes to be obtained that are highly weldable and workable in the installation phase.

The water pipes are produced with (HF) longitudinal welding from hot rolled strip, comply with the prescriptions of standard EN 10224 and can be coated externally with polyethylene and lined internally with epoxy varnish. Arvedi water pipes are made and supplied in compliance with standard EN 10224 and CE certified (in accordance with European Directive 305/11 CE) and are accompanied by a performance declaration (as per directive EU 305/2011).

ARVEDI LINE PIPE

ARVEDI line pipes are tubes destined for conveying pressurised fluids and are typically used in the civil and industrial oil and gas sectors. These pipes are supplied both crude and coated in polyethylene and are produced and supplied in accordance with standard API5L and ISO 3183. ATA produces line pipe using high frequency (HF) induction welding without the addition of filler materials.
THE ENVIRONMENT: A CERTIFIED PASSION

OCTG tubes are used in wells and oil & gas production plants; these tubes are produced and supplied in compliance with standards API5CT and ISO 11960.

Arvedi Tubi Acciaio’s commitment to the protection of the environment is shown not only by the constant monitoring and strict compliance with the emissions standards imposed by national laws and the decrees of regional and local governments, but also by the fact that it was among the first Italian companies to obtain ISO 14001 environmental certification.

Still with a view to reducing the impact on the environment, particular efforts are directed at energy saving and for this reason an energy management system has been implemented, certified in compliance with ISO 50001, the aim of which is to constantly improve energy efficiency.

The production of tubes destined for special applications, working in a spirit of innovation in order to improve production process performances, strengthening relations with customers and improving their degree of satisfaction with products and performances in line with expectations, are the results achieved thanks to ISO 9001 certification, and for automotive products ISO TS 16949.

An important step in the development of its organisation was the adoption of the Organisation, Management and Control Model as per Decree Law 231/01 and a Code of Ethics. The Code of Ethics adopted clearly and transparently defines the values as a whole which inspire Arvedi Tubi Acciaio and are set out in order to establish clear rules of behaviour for carrying out its professional activity.

THE ENVIRONMENT: A CERTIFIED PASSION

The OHSAS 18001 certified management system involves the ownership, management and all employees in a programme of continuous improvement to ensure the safety and health of the workers.

The production range of API 5CT:

<table>
<thead>
<tr>
<th>LABEL</th>
<th>diameter</th>
<th>OD</th>
<th>wall thickness</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.050</td>
<td>1.050</td>
<td>26.7</td>
<td>0.113</td>
<td>2.87</td>
</tr>
<tr>
<td>1.315</td>
<td>1.315</td>
<td>33.4</td>
<td>0.154</td>
<td>3.61</td>
</tr>
<tr>
<td>1.660</td>
<td>1.660</td>
<td>42.4</td>
<td>0.180</td>
<td>3.91</td>
</tr>
<tr>
<td>1.900</td>
<td>1.900</td>
<td>48.3</td>
<td>0.196</td>
<td>4.30</td>
</tr>
<tr>
<td>2.063</td>
<td>2.063</td>
<td>52.4</td>
<td>0.205</td>
<td>4.80</td>
</tr>
<tr>
<td>2.375</td>
<td>2.375</td>
<td>60.3</td>
<td>0.230</td>
<td>5.73</td>
</tr>
<tr>
<td>2.755</td>
<td>2.755</td>
<td>73</td>
<td>0.280</td>
<td>6.66</td>
</tr>
<tr>
<td>3.500</td>
<td>3.500</td>
<td>88.9</td>
<td>0.375</td>
<td>8.69</td>
</tr>
<tr>
<td>4.000</td>
<td>4.000</td>
<td>101.6</td>
<td>0.575</td>
<td>11.46</td>
</tr>
<tr>
<td>4.600</td>
<td>4.600</td>
<td>114.3</td>
<td>0.771</td>
<td>14.14</td>
</tr>
</tbody>
</table>