OIL&GAS APPLICATIONS
Stainless Steel and Nickel Alloys Seamless Tubular Solutions
The Tubacex Group has become one of the main suppliers of Seamless Stainless Steel and Nickel alloy tubes for the Oil&Gas industry. Our integrated production process is comprised of a steel making plant, 3 extrusion presses and more than 20 cold pilger mills and draw benches that allow us to supply tubes for different Top Side, Onshore and Upstream applications. The Oil&Gas industry is a keystone in the Tubacex strategy.

Our organization and investments are continuously being adapted to the growing hostile conditions that Companies of this sector are facing everyday. These new challenging corrosive environments and applications are driving us to implement in our mills the most advanced verification equipment and inspection procedures for the production and control of tubes for downhole, sub-sea, umbilical,... purposes.

Continuous innovation during the last 30 years has allowed the Companies of the Tubacex Group to become world leaders in the supply of seamless tubes made of stainless steel and nickel alloys to Oil&Gas Companies, fulfilling the tightest requirements.
TUBACEX TUBOS INOXIDABLES - TTI leads the production of OCTG in the facilities located in the north of Spain, whilst SCHOELLER - BLECKMANN EDELSTAHLROHR - SBER develops the production of umbilicals in the facilities located close to Vienna - Austria.

Along with IBF, Salem Tube, Tubacex India and TTA, a wide range of products related to Oil & Gas applications is supplied by Tubacex Group.

These plants are supplied by the Group’s steel plant ACERÁLAVA, located in Spain, which offers a tailor made list of steels and is able to offer exceptions over the standard. Tubacex’s metallurgical engineers are devoted to the development of sophisticated steels capable of operating in the demanding environments of the future.

Tubacex brings the experience of a world leader in the manufacturing of stainless steel tubes and pipes; However a strong R&D effort is needed to fulfill future needs. Tubacex is allocating the needed R&D resources, together with VALLOUREC the world leader in the production of seamless hot rolled steel tubes, aiming to be a partner for future solutions.
Subsea Umbilicals Risers Flowlines

TUBACEX is present in the market of base tubular products for:

- Flowlines
- Riser
- Manifold
- Jumpers
- Loops
- Subsea umbilicals

Subsea umbilicals are control lines used in offshore wells where Christmas trees (an assembly of control valves, gauges and chokes that control oil and gas flow in a completed well) are installed on the ocean floor. Umbilicals make up part of Tubacex SURF package of tubular products for off-shore, which offer high resistance to sea water environments and to the fluids transmitted through the tubes.

A key point in our strategy was to take the decision of making a huge investment in a state of the art new mill, fully dedicated to the production of umbilical tubing. This new production unit integrates the best available technologies and know-how for the production of the best quality product. Highly automatic facilities and a fully integrated traceability system contributes to a very costly efficient product.

Duplex and Superduplex Stainless Steel – ID from 1/2 to 3.5 inch

Platforms

Tubacex portfolio in Top Side – Platforms in the hardest environment (i.e. Artic Ocean) offers excellent mechanical properties and easy weldability:

- Piping Systems highly resistant to sea water corrosion
- Instrumentation and hydraulic tubing
- Process pipe
- Separators
- Excellent mechanical properties, Easy weldability.

Duplex and Superduplex Seamless Stainless Steel – 3 – 250 mm
Big O.D. pipes, fittings and special parts up to 72

Petrochemical & Gas

Tubacex offers an extensive grade and size portfolio to achieve designers’ expectations regarding several areas & equipments in the petrochem industry:

- Regas Facilities
- Refineries
- Heat exchangers
- Reactors
- Furnaces

Heat resistant austenitic stainless steel and High Nickel Alloys 3 – 250 mm O.D.
LNG Ships

Seamless Stainless Steel tubes supplied by Tubacex also offer clear applications in LNG Ships:
- GTL/LNG AND CRYOGENIC
- High pressure for gas compression units
- Process pipe
- Lines
- Cryogenic lines

Austenitic Stainless Steel 3 – 250 mm O.D.

Downhole casing and production tubing in CRA such as duplex stainless steels and nickel alloys are ideal to cope with the aggressive corrosion found in sour wells due to hydrogen sulphide, carbon dioxide and other chemicals. Predominantly, Tubacex’s downhole casing and production tubing is supplied in cold-worked condition to ensure high strength despite its low weight.

Tubacex tubes cover a wide range of applications:
- HP/HT
- Sour or wet gas
- Enhanced Oil Recovery
- Chlorides, Hydrogen sulphide, free sulphur ...
- Sand screens
- High corrosion resistance
- Chemical injection

Dual-phase grades, superaustenitic and Ni-base grades guarantee an optimum performance for each well’s particular conditions and allows engineers and designers to have a perfect choice depending on the most severe conditions.

Duplex, Superduplex and high Nickel corrosion resistant alloys from 2 3/8 “to 9” O.D. Downhole equipment up to 72”
TUBACEX TUBOS INOXIDABLES - TTI (Subsidiary of TUBACEX, S.A.) has been designated to develop and lead the production of this high quality product in the facilities located in the north of Spain. A key point in our OCTG strategy was the signing of an agreement with Vallourec for common marketing and development of this product. This partnership with a world leader contributes to consolidate our world presence and to satisfy the future growing Customer expectations.

Downhole casing and production tubing in CRA such as duplex stainless steels and nickel alloys are ideal to cope with the aggressive corrosion found in sour wells (due to hydrogen sulphide, carbon dioxide and other chemicals). Predominantly, Tubacex’s downhole casing and production tubing is supplied in cold-worked condition to ensure high strength despite its low weight.

CRA tubings are used in designs with long life, high yield strength requirements and in wells with the most severe corrosive environments
- High temperature
- High pressure of CO2 and/or H2S
- High chlorides content, low pH, presence of free Sulphur...

Grades and equivalences

<table>
<thead>
<tr>
<th>Material</th>
<th>UNS Number</th>
<th>ISO13680/API5CRA</th>
<th>CHEMISTRY</th>
<th>GRADE</th>
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<tbody>
<tr>
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<td>S31803</td>
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</table>

Size range from 2 3/8” to 7” Lengths R2 or R3 depending on wall thickness

Process

<table>
<thead>
<tr>
<th>STEEL MELTING SHOP</th>
<th>HOT EXTRUSION PLANT</th>
<th>COLD FINISHING PLANT</th>
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<tr>
<td>Scrap Yard</td>
<td>Steel Making</td>
<td>Hot Extrusion</td>
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<td>Hollow finishing</td>
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<td></td>
<td>Tubes release to cold finishing</td>
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<td>Cold rolling</td>
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<td>Straightening</td>
</tr>
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<td></td>
<td></td>
<td>Inspection &amp; testing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cutting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Packing &amp; Shipping</td>
</tr>
</tbody>
</table>

- Electric Arc Furnace
- Argon Oxygen Decarburization
- Forging-rolling
- Piercing press
- Extrusion press
- Water quenching
- Straightening
- Cutting
- Pickling - Passivating
- Visual inspection
- PMI
- Pilgering
- Straightening
- Non Destructive Testing (Inc. Hidrotesting)
- Visual inspection
- Mechanical & metallurgical testing
- Cutting
- Marking
- Final documentation
- Packaging
- Release
- Transportation

SAFETY MANAGEMENT SYSTEM OHSAS 18001 QUALITY ASSURANCE ISO 9001 & 14001

OIL&GAS APPLICATIONS
The group manufactures in the following dimensional range

- In 2013, a new finishing line exclusively devoted to OCTG production entered into operation in Tubacex Tubos Inoxidables. This state of the art line, along with the rest of Tubacex Group’s manufacturing capabilities, covers the following range:

### OCTG: TUBACEX MANUFACTURING RANGE

<table>
<thead>
<tr>
<th>STEEL</th>
<th>GRADE</th>
<th>2 3/8”-2 7/8”</th>
<th>3 1/2”-4 1/2”</th>
<th>5”-5 1/2”</th>
<th>6 5/8”-7”</th>
<th>7 5/8”-7 3/4”</th>
<th>8 5/8”-9 5/8”</th>
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<td>65</td>
<td>R3</td>
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<tr>
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<td>110</td>
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<td>R3</td>
<td>R3</td>
<td>R3</td>
<td>R3</td>
<td>R2</td>
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<tr>
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<td>R3</td>
<td>R3</td>
<td>R3</td>
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<td>R2</td>
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<tr>
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<td>R3</td>
<td>R3</td>
<td>R3</td>
<td>R3</td>
<td>R3</td>
<td>R2</td>
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<tr>
<td></td>
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<td>R3</td>
<td>R3</td>
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<td>R3</td>
<td>R2</td>
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<td>R3</td>
<td>R3</td>
<td>R2</td>
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<tr>
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<td>125</td>
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<td>R3</td>
<td>R3</td>
<td>R3</td>
<td>R2</td>
</tr>
<tr>
<td>G3</td>
<td>110</td>
<td>R3</td>
<td>R3</td>
<td>R3</td>
<td>R3</td>
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<td>R3</td>
<td>R3</td>
<td>R3</td>
<td>R3</td>
<td>R2</td>
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</table>

**Quality assurance: ASME quality system**

Tubacex Group holds several approvals as a manufacturer of seamless tube and pipe, and can deliver tubular products in accordance with most international standards.

Approved manufacturer according to TÜV, Lloyd’s register, DNV, Germanischer Lloyd’s, BV, Norsok etc.

- PED 97/23/EC
- AD2000, werkblatt W0
- JIS Mark scheme
- ASME Quality system as material organization for ferrous and non ferrous material
- API Q1 Certificate

### Safety management system OHSAS 18001

Quality assurance ISO 9001 & 14001

- OHSAS 18001:1999

**OIL&GAS APPLICATIONS**
Subsea umbilicals are control lines used in offshore wells where Christmas trees (an assembly of control valves, gauges and chokes that control oil and gas flow in a completed well) are installed on the ocean floor. Umbilicals make up part of Tubacex SURF (Subsea Umbilicals, Risers jumpers, manifolds, loops and Flowlines) package of tubular products for offshore resistant to sea water environments and fluids transmitted through the tubes and with high corrosion resistance to sea water.

For the past years almost any Subsea oil production system in the world utilized Super duplex steel within their umbilical tubes, due to high corrosion resistance in sea water, excellent mechanical properties and resistance and durability. Two superduplex grades are available.

### Materials Selection

**UNS**

<table>
<thead>
<tr>
<th>UNS</th>
<th>C Max</th>
<th>Si Max</th>
<th>Mn Max</th>
<th>P Max</th>
<th>S Max</th>
<th>Cr</th>
<th>Ni</th>
<th>Mo</th>
<th>Cu Max</th>
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<th>W</th>
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</thead>
<tbody>
<tr>
<td>S32750</td>
<td>0.030</td>
<td>0.75</td>
<td>1.00</td>
<td>0.035</td>
<td>0.003</td>
<td>24.0-26.0</td>
<td>6.0-8.0</td>
<td>3.5-5.0</td>
<td>0.5</td>
<td>0.24-0.31</td>
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<td>0.025</td>
<td>0.003</td>
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<td>0.5-1.0</td>
<td>0.20-0.30</td>
<td>0.5-1.0</td>
</tr>
</tbody>
</table>

Note: The above chemical composition is based on ASTM standards. Special requirements for chemical composition can be met, subject to agreement.

This material offer excellent anti-corrosion properties. Pitting Resistance Equivalent according to customer requirements and calculated as per:

- PREN = %Cr + (3.3 x % Mo) + (16 x %N)
- PREW = %Cr + 3.3 x (% Mo + 0.5 x %W) + (16 x %N)

**SUBSEA UMBILICALS: TUBACEX MANUFACTURING RANGE**

**SUPERDUPLEX STAINLESS STEEL - ID FROM 3/8 TO 4 INCH**

<table>
<thead>
<tr>
<th>Production Unit</th>
<th>Tubacex, Spain</th>
<th>SBER, Austria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel grade</td>
<td>UNS S32750, UNS S32760</td>
<td>UNS S32750, UNS S32760</td>
</tr>
<tr>
<td>Tubes finish</td>
<td>Straight</td>
<td>Straight or Coiled</td>
</tr>
</tbody>
</table>

Special demands upon request

### Process

**QUALITY**

- Steel Melting
  - Hollows inspection
  - Cold pilgering
  - Degrasing and cleaning
- Heat treatment
  - Cleanliness Check
  - Parameters monitoring
- Cold forming
  - Straightening
  - OD Polishing
  - Bar code Marking
- Heat treatment
  - Final Inspection
  - On line NDT [UT, EC, OD/WT]
  - Bar coding
  - On line sigma phase detection
  - PMI testing
  - Visual Inspection
  - Mechanical testing
  - Corrosion testing
- Straight tubes release
  - Test results
  - SBER tubes certificate
  - Release note
- Joint welding
  - WPS & WPQR
  - Production test welds
- Coiling
  - Radiography X ray
  - Drying out (dew point)
- Packing & Shipping
  - Pressure testing
  - Flushing & Cleanliness Check
  - Transporta
- In House
  - Final documenta
  - Release
  - Transporta

**SAFETY**

- OIL&GAS APPLICATIONS
Traceability

Traceability is important to us. Each product that leaves our tube factory in Ternitz is provided with a works certificate (company certificate), which is presented to the customer upon delivery. This ensures that the quality-controlled production at SBER is traceable for each customer.

Quality

SCHOELLER-BLECKMANN EDELSTAHLROHR manufacturing processes are designed to ensure maximum quality within the production of its seamless grades of umbilical tubes, with particular focus in the heat treatment process. Non Destructive Testing is used along the total length of all produced tubes. The company holds several approvals as a manufacturer of seamless tube and pipe, and can deliver tubular products in accordance with most international standards. Below are some examples.

<table>
<thead>
<tr>
<th>Quality management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ASME / NCA-3800</td>
</tr>
<tr>
<td>• ISO 9001:2008</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approvals (some examples)</th>
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</thead>
<tbody>
<tr>
<td>• NORSOK M-650</td>
</tr>
<tr>
<td>• ISO 17025 for laboratories</td>
</tr>
<tr>
<td>• PED 97/23/EC</td>
</tr>
<tr>
<td>• Approved manufacturer status from TÜV Lloyd’s register, DNV, Germanischer Lloyd, BV, etc.</td>
</tr>
<tr>
<td>• IBR well-known steel maker</td>
</tr>
<tr>
<td>• AD2000, werkblatt WO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product Standards (some examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ISO/DIS 13628-5</td>
</tr>
<tr>
<td>• ASTM A789</td>
</tr>
<tr>
<td>• ASTM A1016</td>
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<tr>
<td>• ANST SNT-TC-1A</td>
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<tr>
<td>• NAS 1638</td>
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<tr>
<td>• ASME BPVC Section V and Section IX</td>
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<tr>
<td>• ASME B31.3</td>
</tr>
<tr>
<td>• SAE AS 4059</td>
</tr>
</tbody>
</table>
The Tubacex Group has an extensive manufacturing programme for seamless stainless tubing covering most dimensions and grades required by the Oil & Gas Industry. Seamless Stainless Steel Tubing can be hot or cold finished in any of the three mills of the group, covering the following range:

Tubacex has an extensive manufacturing program covering most dimensions requested by the industry.

- Mills located in Europe and USA enable us to produce tubes and pipes from 3mmOD to 20”.
- Austenitic tubes and pipes are produced in accordance with ASTM Standard, ASME Code and Euronorm Standards, fulfilling the main specifications.
- Tubes can be supplied in random lengths, multiple lengths, fixed lengths as well as U-tubes.
- Tubacex also produces Fittings from ½” (5S) to 72” (no WT limitation).

As lengths or dimensions differ according to grade, size and finish, detailed information can be provided upon request.
Specific needs will also be studied at the customer’s request.

### ASTM A 312

<table>
<thead>
<tr>
<th>OD</th>
<th>WT</th>
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<tr>
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</tr>
<tr>
<td>1”1/2</td>
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<td>42”</td>
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*Reference table. Ask for details*
Stainless Steel Grades

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<tr>
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<th>WNr</th>
<th>AFNOR</th>
<th>C max*</th>
<th>Cr</th>
<th>Ni</th>
<th>Mo</th>
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<td>0,03</td>
<td>17/18</td>
<td>13/15</td>
<td>2/3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>317</td>
<td>TU Z 2 CND 19-15</td>
<td>0,08</td>
<td>18/20</td>
<td>11/15</td>
<td>3/4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>317 L</td>
<td>1.4438</td>
<td>TU Z 2 CND 19-15</td>
<td>0,03</td>
<td>18/20</td>
<td>11/15</td>
<td>3/4</td>
<td></td>
</tr>
<tr>
<td>309 S/309 H</td>
<td>1.4833</td>
<td>TU Z 12 CN 24-12</td>
<td>0,08</td>
<td>22/24</td>
<td>12/15</td>
<td>€ 0,75</td>
<td></td>
</tr>
<tr>
<td>310 S/310 H</td>
<td>1.4845</td>
<td>TU Z 12 CN 25-20</td>
<td>0,08</td>
<td>24/26</td>
<td>19/22</td>
<td>€ 0,75</td>
<td></td>
</tr>
<tr>
<td>310 Mo/LN</td>
<td>1.4466</td>
<td>TU Z 12 CN 24-12</td>
<td>0,08</td>
<td>22/24</td>
<td>12/15</td>
<td>€ 0,75</td>
<td></td>
</tr>
<tr>
<td>314</td>
<td>1.4828</td>
<td>TU Z 17 CND 25-20</td>
<td>0,20</td>
<td>19/21</td>
<td>11/13</td>
<td>Si 1,5/2,5</td>
<td></td>
</tr>
<tr>
<td>UNS S31254</td>
<td>1.4547</td>
<td>TU Z 15 CND 25-20</td>
<td>0,15</td>
<td>24/26</td>
<td>19/21</td>
<td>Si 1,5/2,5</td>
<td></td>
</tr>
<tr>
<td>UNS S31803</td>
<td>1.4462</td>
<td>TU Z 2 CND 22-05-03</td>
<td>0,03</td>
<td>21/23</td>
<td>4,5/6,5</td>
<td>2,5/3,5</td>
<td>0,12/0,20</td>
</tr>
<tr>
<td>UNS S32750</td>
<td>24,0/26,0</td>
<td>4,0/6,0</td>
<td>N 0,20</td>
<td>3,0/5,0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNS S32760</td>
<td>1.4501</td>
<td>TU Z 3 CND 25-06-Az</td>
<td>0,03</td>
<td>24/26</td>
<td>6/8</td>
<td>3/5</td>
<td>N 0,20/3</td>
</tr>
<tr>
<td>904 L</td>
<td>1.4539</td>
<td>TU Z 1 CNDU 25-20</td>
<td>0,02</td>
<td>19/21</td>
<td>24/26</td>
<td>Cu 1,2/2,0</td>
<td>N 0,04/0,10</td>
</tr>
<tr>
<td>800-H-HT</td>
<td>1.4876</td>
<td>(TU Z10 NC 32-21)</td>
<td>0,06/0,10</td>
<td>19/23</td>
<td>30/35</td>
<td>Al &amp; Ti 0,15/0,60</td>
<td></td>
</tr>
<tr>
<td>UNS N08020</td>
<td>2.4660</td>
<td>TU Z 12 CND 32-01</td>
<td>0,07</td>
<td>19/21</td>
<td>32/38</td>
<td>Cu 3/4 Nb + Cr 1,0</td>
<td>Fe Balance</td>
</tr>
<tr>
<td>UNS N08825</td>
<td>2.4858</td>
<td>TU Z 12 CND 32-12</td>
<td>0,05</td>
<td>19,5/23,5</td>
<td>38/46</td>
<td>Cu 1,5/2,0</td>
<td>Ti 1,0/1,2</td>
</tr>
<tr>
<td>UNS N08028</td>
<td>1.4563</td>
<td>TU Z 22 CNDU 31-27</td>
<td>0,03</td>
<td>26/28</td>
<td>30/32</td>
<td>Fe Balance</td>
<td></td>
</tr>
<tr>
<td>G-3 NO6985</td>
<td></td>
<td></td>
<td>21,0/23,5</td>
<td>44,0/52,0</td>
<td>6,5/8,0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Maximum unless otherwise indicated

Improved Machinability Available

MECATEX

From our steel plant Aceralava (spain) we offer a tailor made list of steels. Our metalurgical engineers are devoted to the development of sophisticated steels capable of operating in the demanding environments of the future.

In addition to these standards, Tubacex’s capabilities include a wide range of stainless steel and high nickel alloy grades to complement all the needs of our customers.

Tubacex’s manufacturing range covers the main stainless steel grades requested by the oil & gas industry. Exceptions over the standard steel grades are satisfied through our Steel Melting Shop Aceralava.
Tubacex is a fully integrated company with one melting shop (in Spain), two extrusion facilities (in Spain and Austria) and three cold finishing facilities (in Spain, Austria and the USA). The Group is capable of producing seamless steel tubes in hot and cold finishing.

STEEL PRODUCTION

<table>
<thead>
<tr>
<th>Scrap metal</th>
<th>Electric power + alloys</th>
<th>Ingots</th>
<th>Ingots</th>
<th>Reheating</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARC FURNACE</td>
<td>AOD</td>
<td>CASTING</td>
<td>INGOTS</td>
<td>PIT FURNACE</td>
</tr>
</tbody>
</table>

General description of the process. Additional specialized equipment not included in the graphic above.

HOT FINISHED PRODUCTION

<table>
<thead>
<tr>
<th>Tubacex Tubos Inoxidables</th>
<th>Schoeller Bleckmann Edelstahlrohr</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOT EXTRUSION PLANT</td>
<td>HOT EXTRUSION PLANT</td>
</tr>
<tr>
<td>Llodio, SPAIN</td>
<td>Ternitz, AUSTRIA</td>
</tr>
<tr>
<td>• 80-250 mm OD</td>
<td>• 38-250 mm OD</td>
</tr>
<tr>
<td>• Horizontal induction furnaces</td>
<td>• Horizontal induction furnaces</td>
</tr>
<tr>
<td>• Expanding press (hydraulic, 1,600 ton)</td>
<td>• Expanding press (hydraulic, 1,600 ton)</td>
</tr>
<tr>
<td>• Vertical induction furnaces</td>
<td>• Vertical induction furnaces</td>
</tr>
<tr>
<td>• Extrusion press (hydraulic, 4,300 ton)</td>
<td>• 2 Extrusion presses (hydraulic, 2,000 and 3,300 tons)</td>
</tr>
<tr>
<td>• Soaking furnace (walking beams)</td>
<td>• Soaking furnace (walking beams)</td>
</tr>
<tr>
<td>• Stretching - reducing mill</td>
<td>• Stretching - reducing mill</td>
</tr>
<tr>
<td>• Heat treatment</td>
<td>• Heat treatment/bright annealing furnace</td>
</tr>
<tr>
<td>• N.D. testing (ultrasonic, hydrostatic)</td>
<td>• N.D. testing (ultrasonic, hydrostatic)</td>
</tr>
<tr>
<td>• Finishing lines</td>
<td>• Finishing lines</td>
</tr>
</tbody>
</table>

General description of the process. Additional specialized equipment not included in the graphic above.

COLD FINISHED PRODUCTION

<table>
<thead>
<tr>
<th>HF Hollows</th>
<th>Cold pilgering</th>
<th>Degreasing</th>
<th>Heat treatment</th>
<th>Straightening</th>
<th>Pickling</th>
<th>Quality control</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF HOLLOWS</td>
<td>COLD PILGERING/DRAWING</td>
<td>DEGREASING</td>
<td>HEAT TREATMENT</td>
<td>STRAIGHTENING</td>
<td>PICKLING</td>
<td>UT TEST</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EC TEST</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LEAK</td>
</tr>
</tbody>
</table>

General description of the process. Additional specialized equipment (Drawing bench, coiling & welding facilities, U-bending equipment...) not included in the graphic above.

BIG OD PIPING BORING

<table>
<thead>
<tr>
<th>IBF Tubes</th>
<th>Outside Machining</th>
<th>Boring</th>
<th>Lapping</th>
<th>Heat Treatment</th>
<th>Bevelling</th>
<th>Quality Control</th>
<th>Pipes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OUTSIDE MACHINING</td>
<td>BORING</td>
<td>LAPPING</td>
<td>HEAT TREATMENT</td>
<td>QUALITY CONTROL</td>
<td>PIPES</td>
<td></td>
</tr>
</tbody>
</table>

General description of the process. Additional specialized equipment not included in the graphic above.
**General description of the process. Additional specialized equipment not included in the graphic above.**

**Pipe Cuttine**, **Reducing**, **Straightening**, **Cutting**, **Pickling**, **Quality Control** = **Hot finished tubes**

**Extruding**, **Reduction**, **Passivation**, **Deglazing**, **Cutting**, **Straightening** = **Bars**

**Cutting**, **Packing** = **Cold finished tubes**

**FITTINGS HOT & COLD FORMING**

- **IBF Fittings**
  - Vertical presses
  - Heat treatment
  - Cold finishing equipment through CFF
- **TFA**
  - 5 Hydraulic draw presses
  - 9 Vertical hydraulic presses
  - 3 Heat Treatment furnaces
  - Finishing equipment

**Tubacex Tubos Inoxidables**
- Amurrio, SPAIN
- Cold finishing plant
  - 19 – 193 mm OD
  - Pilger cold rolling mills
  - Heat treatment furnaces
  - N.D. testing (eddy current, ultrasonic, hydrostatic)
  - Finishing lines

**Schoeller Bleckmann Edelstahlrohr**
- Temitz, Austria
- Cold finishing plant
  - 6 – 250 mm OD
  - Pilger cold rolling mills
  - Drawing benches
  - Heat treatment furnaces
  - N.D. testing
  - Finishing lines

**Salem Tube Greenville, PA, USA**
- Cold finishing plant
  - 3-57 mm OD
  - Drawing benches
  - Heat treatment
  - N.D. testing (eddy current, ultrasonic, hydrostatic)

**Tubacex Prawash**
- 6-273,1 mm OD
  - Piercing
  - Pilgering
  - Drawing benches
  - U-bending

**Acería de Álava**
- Steel Melting Shop
  - Amurrio, Spain
  - Acería Electric Arc Furnace (100 tons)
  - AOD converter (60 tonnes)
  - 8 soaking pit furnaces (gas heated)
  - Blooming rolling mill
  - Heat treatment
  - Peeling and polishing
  - Non destructive tests
Tubacex Group holds several approvals as a manufacturer of seamless tube and pipe, and can deliver tubular products in accordance with most international standards.

**Quality and Approvals**

**Management system certificates**

- ISO 9001
- API Q1

**Approvals and other certifications**

- Approved manufacturer according to TÜV, Lloyd's register, DNV, Germanischer Lloyd's, BV, Norsok etc.
- PED 97/23/EC
- AD2000, werkblatt W0
- JIS Mark scheme
- ASME Quality system as material organization for ferrous and non ferrous material

* Not valid for all production units. Please contact your local sales office for detailed information.

**Safety and environmental responsibility**

Tubacex Group is highly engaged with the environment and it is ISO 14001 certified. Additionally Occupational health and Safety is also a key element of our culture. The company is OHSAS 18.001 certified.
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Currently the Tubacex Group is exporting into more than 100 countries worldwide from its manufacturing sites and warehouses. The company has 15 commercial offices and a wide network of agents in several countries that lead to a global presence.