TECTUBI RACCORDI S.p.A.

TURNED, BORED & HONED PIPES PERFORMANCE

Our production for the market
of large-size and heavy walled machined pipes

Technical details, unique production capabilities

Large-size and heavy walled machined pipes (turned, bored and honed pipes) are generally used when the standard production processes, i.e. rolling by classic equipment like multi-stand plug mill, pilger mill, expander mill, etc., are not applicable. They are usually employed to produce:

- components used in the severe temperature/pressure conditions typical of the power generation industry (e.g. headers and large OD pipes in thermal power plants), Oil&Gas (e.g. manifold, process components in oil wells and petrochemical plants), often in conjunction with high corrosion environments, as typical of sour applications, and/or high temperature oxidizing and corrosive atmospheres, as typical of coal-fired ultra-supercritical power plants, thermal biomass plants, and incinerators
- small quantity series, also characterized by specialist geometrical, metallurgical and mechanical properties
- short delivery time products

To produce high quality large-size and heavy walled machined pipes (turned, bored and honed pipes) the selection of highly reliable partners and constant quality demi products (e.g. ingots) is fundamental. For this reason, the primary product obtained as forged bar, is produced by using the most modern steel plant equipment and refined steel making practices. These include:

- Electric Arc Furnace followed by Argon Oxygen Decarburization in the case of stainless steels and super alloys (e.g. Ni-based alloys),
- Secondary Metallurgy in ladle furnace and Vacuum Degassing for reducing gas content in molten steel (hydrogen in particular) for all steel grades,
- Vacuum Arc Remelting and/or Electro-Slag Remelting (ESR) for final secondary steel refining, when very low inclusion content and high chemical homogeneity are required.

The guarantee of total quality

Through skilful and expert sequencing of machining operations, including lathe, boring, coring, drilling and honing, **Tectubi Raccordi** is able to guarantee to the Client with the most stringent tolerances on both ID and OD, end bevel, and surface roughness (Ra ≤ 1.1 micron or even better).

Tectubi Raccordi is equipped with state-of-the-art quality heat treatment furnaces, calibrated on a regular basis (once per year, twice per year in case of nuclear applications), fully instrumented with thermocouples in the furnace chamber and on the pieces, whose data are recorded for post-processing analysis, certification (on Client demand only) and long-term storage for quality purposes. High efficiency water tanks have been designed in-house and tested to obtain the best cooling conditions on bored pipes up to 12 meters length.

All kinds of fittings and piping for the energy markets, including large-size and heavy walled machined pipes

Tectubi Raccordi is a well-known and well-established leading Italian manufacturer of buttwelding fittings and renowned worldwide industrial brand in special products for energy production and transmission systems: petrochemical plants, LNG plants, Oil&Gas pipelines, chemical refineries, fertiliser plants, thermal power and offshore, with an in-house unit fully dedicated to the nuclear sector.

Tectubi Raccordi complies with the most stringent Client requirements and all relevant international specifications and standards. More than 90% of the Company's production is exported worldwide, confirming and reinforcing its long-established international reputation.

The Company is part of **Allied Group**, which manages the whole process (raw material procurement, project management, manufacturing, stock, distribution, delivery and related services) in the production and worldwide distribution of all types of buttwelding fittings, heavy walled pipes included.

A strategic choice

In the **turned**, **bored & honed pipes** sector, **Tectubi Raccordi** has listened to the requirements of its clients in developing a precise strategic choice. It has built a solid partnership with the most accredited Italian suppliers of specific raw materials for specific applications, thereby guaranteeing a very select supply chain (e.g. Aso Group, Cena Interpipes, F.T.M. Foratura Tornitura Meccanica) whilst rigorously keeping the fundamental stages of heat treatments, non-destructive testing and final quality certification within its own manufacturing process.

This has created greater advantages for the market and for the most demanding clients, who get the best out of each manufacturing phase and benefit from a precise sales policy:

- high quality raw material
- guaranteed final quality supplied directly by **Tectubi Raccordi**
- the capacity to supply clients with the quantity requested, even the smallest of orders
- prompt replies to enquiries about dimensions and specific tolerances, and about chemical, physical, mechanical and metallurgical characteristics
- design of the best technological solution for each application
- transparent supply chain fit for commercial relationships based on trust

This mode of working has led to excellent market results and is also the best interpretation of the **Allied Group** philosophy.

TURNED, BORED & HONED PIPES

DESCRIPTION

The production process starts with a full round forged bar, which is cored using a steel core recovery process according to state-of-the-art production technologies (e.g. EAF+AOD for stainless steels, VOD for all steel grades, VAR/ESR for special applications) and steelmaking procedures (e.g. clean steel).

State-of-the-art heat treatment furnaces are used. Coupled with brand new batch and bell furnaces (up to 14 meters in length), special water tanks have been designed in-house to ensure the highest cooling rates during quenching even for large-size and heavy walled machined pipes. This production process, which is quite unique in its industrial sector, allows **Tectubi Raccordi** to obtain the most stringent and repeatable product characteristics (mechanical and metallurgical) on all of the bored pipe dimensions, up to 12 meters in length.

The resulting pipe can be turned and bored to the final required size. Meanwhile, the core can also be drilled to obtain a smaller size, which in turn can be bored again. This procedure can be repeated until the core can no longer be bored and turned. Final quality inspection (e.g. PT, UT, MT) and control (including certification and destructive tests), marking, packing, and shipping complete the manufacturing sequence, in strict compliance with HSE regulations (e.g. ISO:14001, OHSAS:18001) and main international standards.

MATERIALS

Alloy steel (e.g. grades: P91, P92)
Stainless steel (e.g. grades: TP304H, TP316LN, TP321H, TP347H, TP316L)
Duplex and **Superduplex steel** (e.g. UNS: S31803, S32205, S32750, S32760)
Nickel alloy (e.g. UNS: N04400, N06625, N08800, N08825)

Material chemical composition, mechanical properties and metallurgical features are in accordance with the most used international standards (e.g. ASTM/ASME, EN, DIN, GOST) and Client specifications.

PRODUCTION RANGE

Maximum Outer Diameter (OD)	1600 mm (larger sizes can be made upon request)
Maximum Internal Diameter (ID)	1200 mm
Maximum Wall Thickness (WT)	to be agreed with the Client

ADVANTAGES

Possibility to produce medium and large sizes

Very close tollerance on OD/ID/WT	
OD	+/- 1 mm
ID	+/- 1 mm for standard not honed products
ID	H7 or H8 for honed pipes
WT	-0+1 mm or in any case within the tolerances on the difference between OD-ID
Roughness (Ra)	min >= 0.2 Micron

Possibility to produce different sizes from the original full bar

APPLICATIONS FIELD

Power generation including nuclear
Oil&Gas
Offshore & Subsea
Petrochemicals

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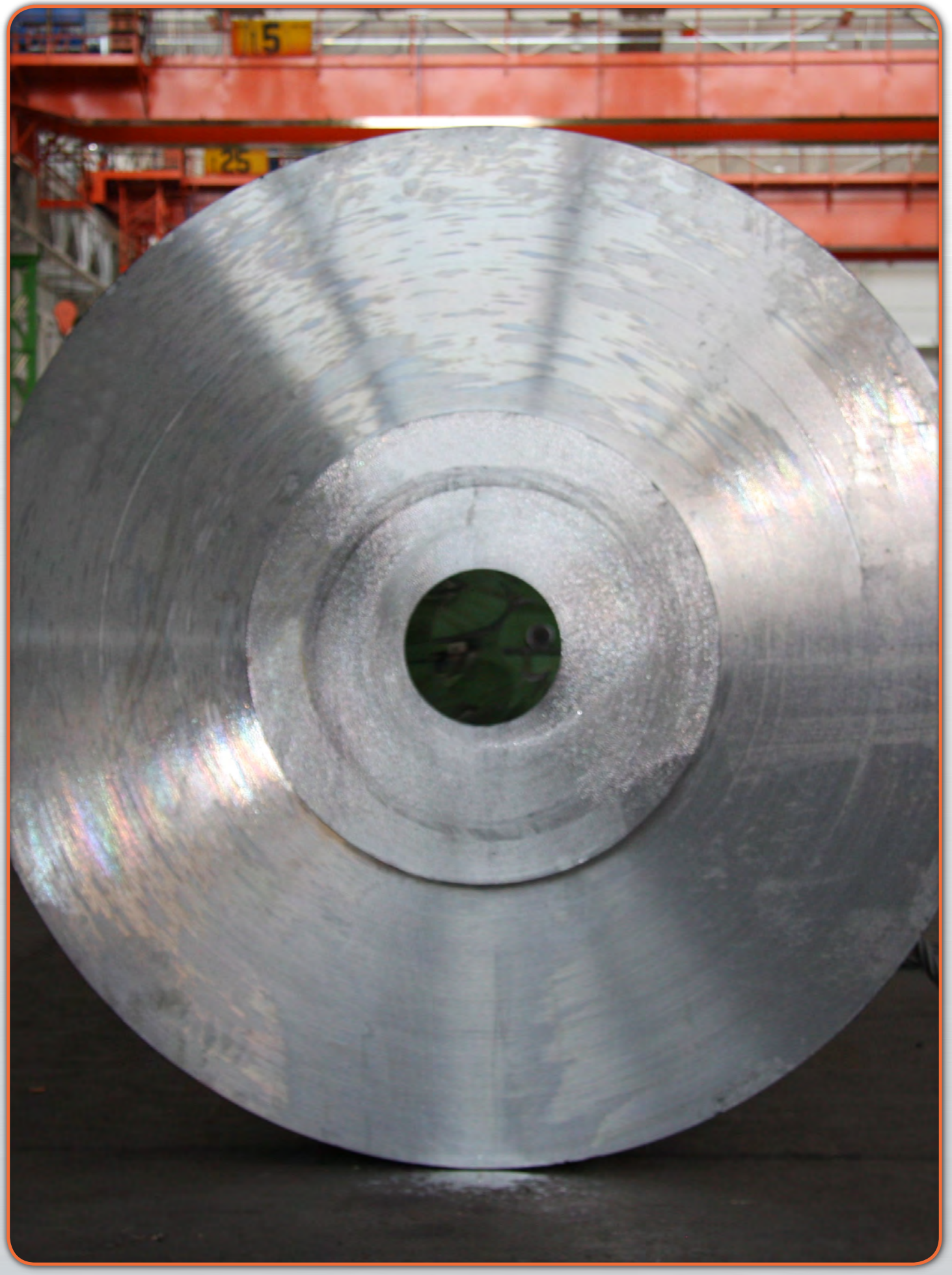
Machinery and production process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ALLIED GROUP

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