

We develop some of the cleanest and strongest specialty alloy steels in the world. We understand our customers' challenges, and we apply our metallurgical and application knowledge to develop solutions that help improve product durability.

Our 250-acre Gambrinus Steel Plant in Canton, Ohio, produces seamless mechanical steel tubing ranging from 1.9 to 13 inches (48 to 330 mm) in diameter and processes alloy steel rounds up to 13 inches (330 mm) in diameter.

We began steel finishing operations at Gambrinus in 1929. This process provided the capability to alter the physical (size and shape) and metallurgical (hardness, strength and ductility) properties of steel. We later added a piercing mill – capable of converting round, solid steel billets into seamless steel tubes – as well as two additional piercing mills and a variety of steel finishing and inspection functions.

Today, the finishing operations include thermal treatment, cutting, straightening, and other functions. We use ultrasonic equipment, eddy current, magnetic particle testing, laser OD gauging, isotropic gauging and spectrometers to inspect product.

Nearly half of all our steel shipments pass through Gambrinus. This includes 350,000 tons of tube-making, 200,000 tons of tube and bar thermal treat and nearly 50,000 tons of bar inspection.

In 2013, we introduced our new intermediate finishing line (IFL) at Gambrinus – a more than \$50 million investment that improves safety and reduces processing times. Key IFL benefits are:

■ **Quality.** The line's automated testing and piece tracking helps improve our testing efficiency. It also provides information to help achieve up-stream process improvements as well as an enhanced surface for non-destructive test inspection by removing surface dirt and mill scale.

■ **Processing times.** The line's single in-line testing and finishing processes can reduce processing time from days to hours.

■ **Safety.** The line incorporates the latest technologies and employs lean processes each day, significantly eliminating product touches and miles in material movements.

■ **Environmental stewardship.** The line incorporates an environmentally friendly water jet de-scaling spray system that replaces our existing pickling process. This new technology advances our waste minimization philosophy.

Customers use products that we produce at Gambrinus in bearings, energy drilling equipment, off-highway equipment, transmissions and other applications.

Making Your Visit Safe and Enjoyable

A TimkenSteel team member will serve as your tour guide. Please stay with that individual at all times on the approved tour route and away from operating equipment. We prohibit food, drinks and smoking on the plant tour as well as use of cameras and picture phones. Also, please inform your tour guide if you have a pacemaker.

For your protection, you must wear safety glasses, safety jackets, hard hats and earplugs at all times. We recommend wearing steel-toed shoes, and visitors must avoid wearing tennis or athletic, open-toed or open-heeled shoes.

We are proud to welcome you to the Gambrinus Steel Plant.



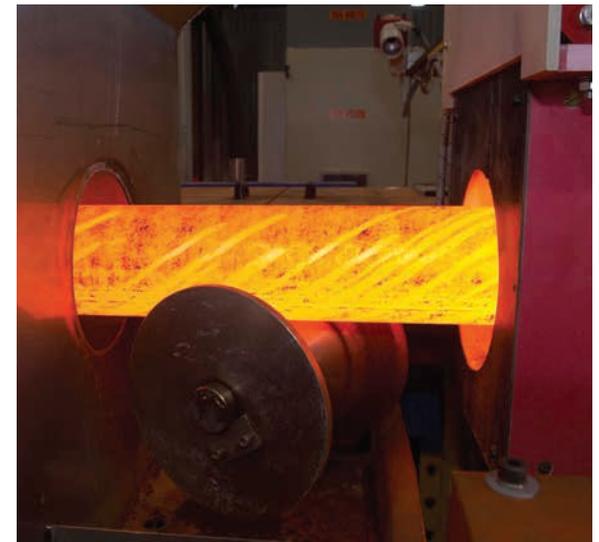
For more information on TimkenSteel and other value-added services and products, call 866.284.6536 (USA) or +44 1455 826320 (international).

Also, please visit our website at www.timkensteel.com.

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Your Guide to the Gambrinus Steel Plant



Making TimkenSteel Seamless Mechanical Tubing

Tube Making Mills – 1, 2, 3

The process of providing customers with seamless mechanical tubing begins at one of the three piercing mills at Gambrinus. Before a solid round billet can become a tube, we heat it in a gas-fired rotary furnace at temperatures ranging from 2000-2300 degrees Fahrenheit.

In our piercing mills, two barrel-shaped rolls – driven by motors with up to 3,000 horsepower capacity – begin rotating the billet. These rolls force the billet over a point or plug that a mandrel rod holds in place. These forces, created by the turning rolls, form the billet into a hollow tube.

We further size the newly formed tube shell by rolling it through an elongator or plug mill to produce the correct wall thickness. We then adjust the final outside diameter and roundness by rolling the tube through a reduction mill and rotary sizing mill respectively. Finally, we cool the tubes – depending on the mechanical properties or microstructure – in a mill anneal furnace or on a cooling bed.

Thermal Treatment – 4, 5, 6

We control the strength, toughness, hardness and microstructure of steel to meet customer requirements by applying appropriate thermal or heat treating. We specially formulate heating and cooling cycles to:

- Make the desired tensile strength and hardness.
- Produce the best combination of strength and resistance to sudden impacts.
- Improve the productivity of metal cutting or cold forming.
- Remove residual stress.

The thermal treatment area uses batch furnaces, roller furnaces and three in-line treatment facilities.

Finishing & Inspection – 7, 8, 9, 10, 11, 12, 13, 14

■ Finishing

The finishing of bar and tube products to customer standards starts with straightening and cutting tubes to specified lengths. The process features our new intermediate finishing line, ending with final inspection and shipping preparation.

For straightening, we press or roll the entire length of each bar or tube in specialized machinery. This operation removes bows, hooks or bends from the product. For cutting, we use band saws and rotary cut-off machines to cut bars and tubes to customer- specified lengths.

To provide our customers with additional tubing value, we inspect our tubing using electronic equipment that locates defects that the human eye can't see. We use in-line non-destructive eddy current testing to inspect tube surfaces.

Ultrasonic equipment measures wall thickness and tests for internal defects. Off-line inspection includes visual inspection and magnetic particle testing to check for surface defects. We perform spectrometer testing to assure that our tubing is of the proper metallurgical grade. In addition, we check product dimensions with lasers or other gauges.

■ Inspection

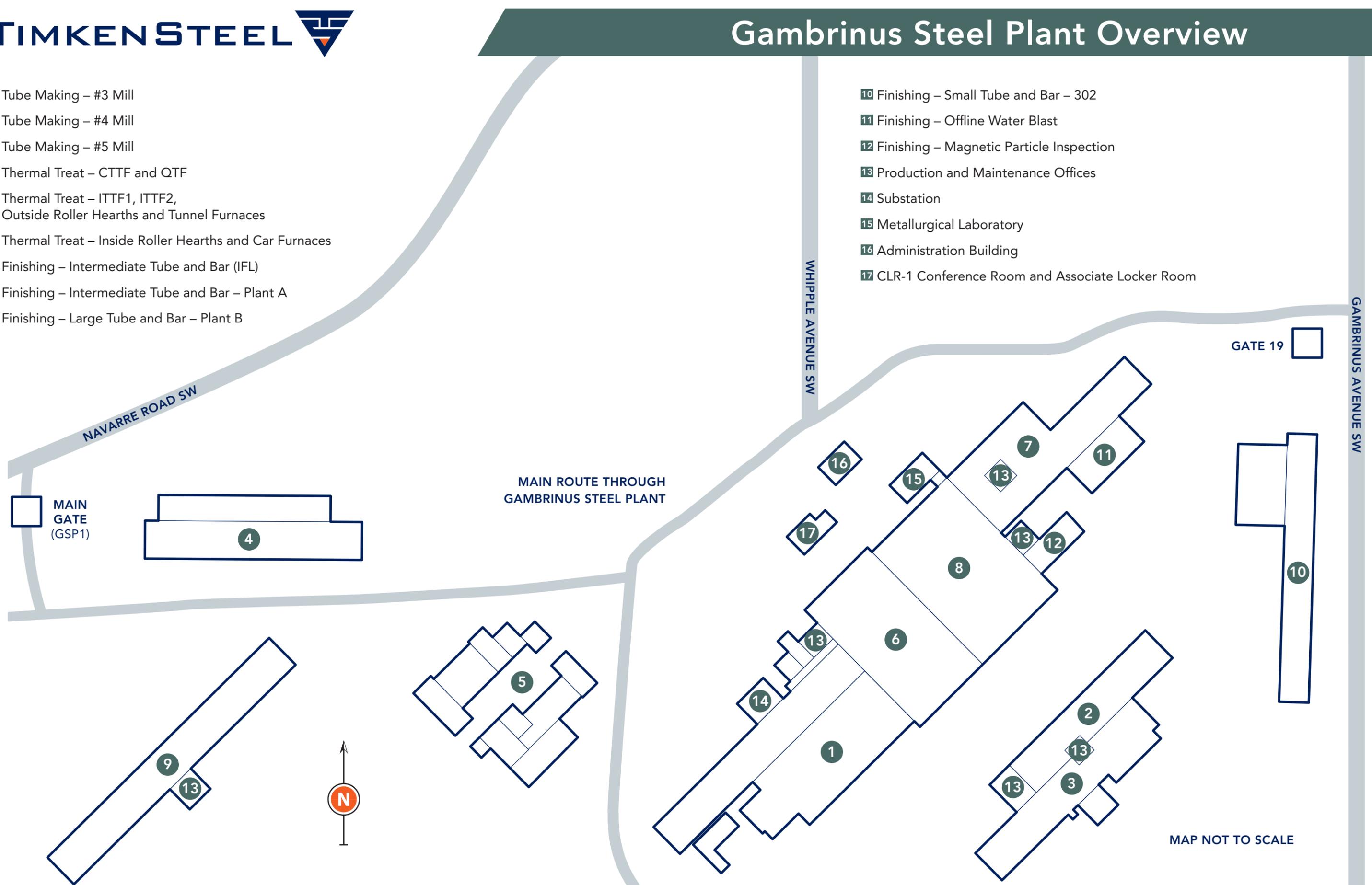
Our tubing receives a final inspection through our ship preparation line. We calculate tubing length and weight, paint this and the order identity on the product. The line also stencils each tube according to customer specifications and sorts the tubing into bundles.

Upon completion of the piercing, thermal treat, finishing and inspection processes, we band the steel tubing and ship it to customers.



- 1 Tube Making – #3 Mill
- 2 Tube Making – #4 Mill
- 3 Tube Making – #5 Mill
- 4 Thermal Treat – CTF and QTF
- 5 Thermal Treat – ITTF1, ITTF2, Outside Roller Hearths and Tunnel Furnaces
- 6 Thermal Treat – Inside Roller Hearths and Car Furnaces
- 7 Finishing – Intermediate Tube and Bar (IFL)
- 8 Finishing – Intermediate Tube and Bar – Plant A
- 9 Finishing – Large Tube and Bar – Plant B

- 10 Finishing – Small Tube and Bar – 302
- 11 Finishing – Offline Water Blast
- 12 Finishing – Magnetic Particle Inspection
- 13 Production and Maintenance Offices
- 14 Substation
- 15 Metallurgical Laboratory
- 16 Administration Building
- 17 CLR-1 Conference Room and Associate Locker Room



MAP NOT TO SCALE