THERMOPROCESSING PLANTS AND EQUIPMENT

OTTOJUNKER
WE UNDERSTAND METALS

Cu

TAILOR-MADE INNOVATIONS

... FOR COPPER ROLLING MILLS

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Otto Junker GmbH

Established in 1924, **OTTO JUNKER GmbH** draws on more than 90 years of experience and continuous product development. The company is represented by subsidiaries, service agencies and sales offices all over the world.

The product range embraces melting, casting, heating and heat treating equipment for the aluminium and copper industries as well as melting and casting equipment for iron and steel foundries.

Our foundry in Lammersdorf produces high-grade sand castings from iron, nickel and cobalt-based materials, both as cast and fully finished. In the attached machining section, precision parts are made for demanding applications.

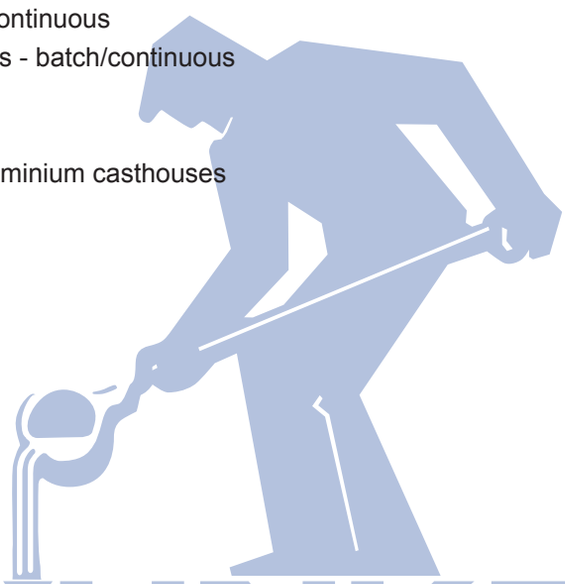
Since 1982, the company has been owned by the OTTO JUNKER FOUNDATION. Consistent with the Foundation‘s charter, it promotes the training of young engineers at the RWTH Aachen University and sponsors research and development in the fields of metallurgy and electrical engineering.

The **“thermoprocessing“ business unit** designs, manufactures and installs equipment for customers in the aluminium and copper industries, mainly for:

- Rolling mills (slab, plate, sheet, strip, foil manufacturers)
- Extrusion plants (billet, rod, tube, profile manufacturers)
- Casting shops
- Forging plants
- Aluminium casthouses

In these industries the following OTTO JUNKER products are mainly used:

- Preheat and homogenizing furnaces - batch/continuous
- Annealing, heat treatment and ageing furnaces - batch/continuous
- Degreasing, annealing and pickling lines
- Hot dip tinning lines
- Gas-fired melting and pouring furnaces for aluminium casthouses



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Tailor-made innovations

With over 400 systems installed worldwide on degreasing, annealing and pickling lines, OTTO JUNKER is the leading supplier of continuous strip processing equipment for copper and its alloys, including brass and bronze.

Notably, OTTO JUNKER is the single-source vendor capable of meeting your entire equipment needs. This means that not just the system‘s core unit – the furnace – will be made by OTTO JUNKER. We also build associated equipment such as:

- coilers with coil car, belt wrapper and automatic spool loader
- shears
- strip joining systems
- cleaning and degreasing stations
- brushing machines for cleaning and surface finishing
- flush or spray pickling systems
- passivating chambers
- strip accumulators
- strip flotation furnaces (gas or electrically heated) for temperatures up to 900 °C
- protective gas systems for “HN lean“ and “HN rich“ operation with up to 50 % hydrogen
- vertical furnaces

It is thus ensured that the customer will obtain just the right equipment to suit his specific product portfolio. Thanks to our in-house development and design, all equipment components are guaranteed to match perfectly, for the benefit of product quality.

Process engineering

Trials can be carried out at the OTTO JUNKER Tech Center, especially in the context of new product launches, quality improvements and production output increases. Our trial facilities include the following:

- strip flotation furnace
- chamber furnace
- mathematical process modelling
- flotation testing with up to 2,350 mm wide strip
- hot-dip tin coating line
- mist quench

Continuous strip treatment line for degreasing, annealing and pickling

Horizontal strip flotation furnace

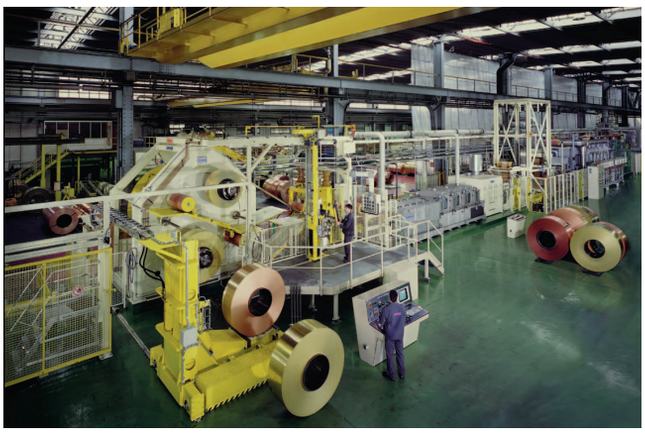
OTTO JUNKER continuous strip treatment furnaces for degreasing, annealing and pickling processes cover the full range of products and alloys:

- strip thicknesses from 0.043 mm – 3 mm
- strip widths from 300 – 1300 mm
- strip flotation furnaces for temperatures up to 900 °C
- annealing with no strip contact and nearly no tension
- strip speeds up to 100 m/min for maximum throughput
- furnaces with protective gas and hydrogen atmospheres
- outstanding temperature uniformity over the entire strip width
- reproducible production results
- continuous operation

Our ongoing development and product improvement, often conducted in cooperation with the customer, ensure that OTTO JUNKER‘s equipment remains the most advanced state of the art.

In the continuous refinement and optimization of our machinery and systems, OTTO JUNKER relies on a close R&D collaboration with various institutes of the RWTH Aachen University, in addition to the resources of its own development departments. It is this innovation and closeness to the customer on which our technology leadership is based.

Horizontal strip flotation furnace for various strip widths and strip thicknesses



Strip width 300 – 650 mm | Strip thickness 0.05 – 0.9 mm
System with turning reel

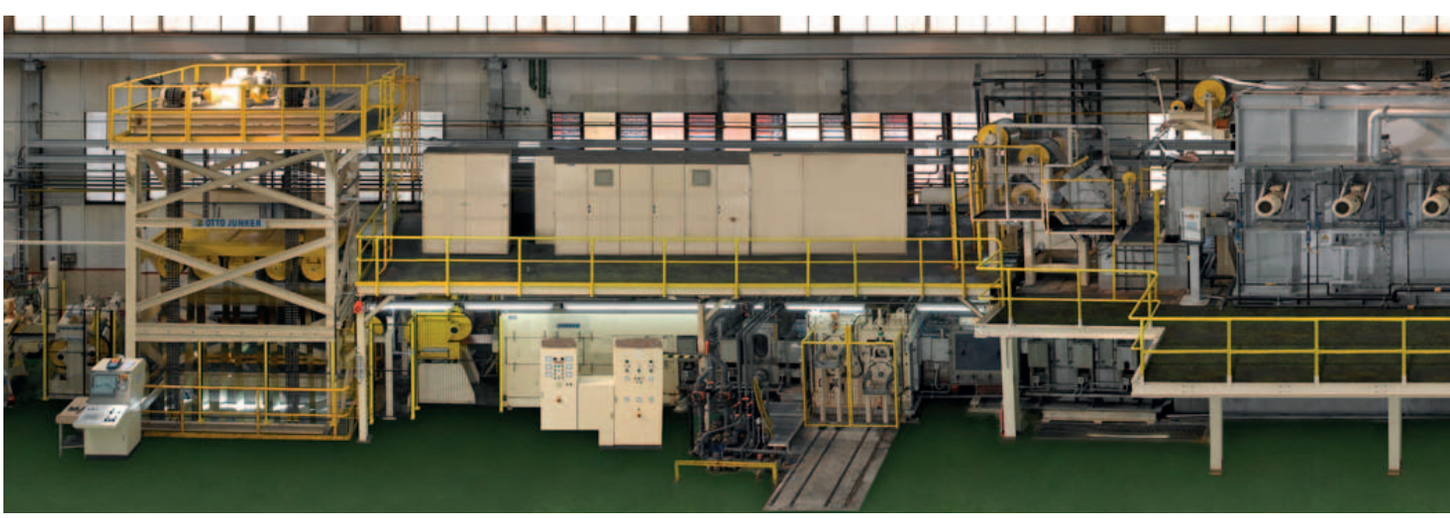
Strip width 300 – 700 mm | Strip thickness 0.043 – 0.8 mm

Strip width 400 mm | Strip thickness 0.08 – 1.2 mm

Strip width 450 – 1,300 mm | Strip thickness 0.2 – 2.2 mm

High temperature strip treatment system

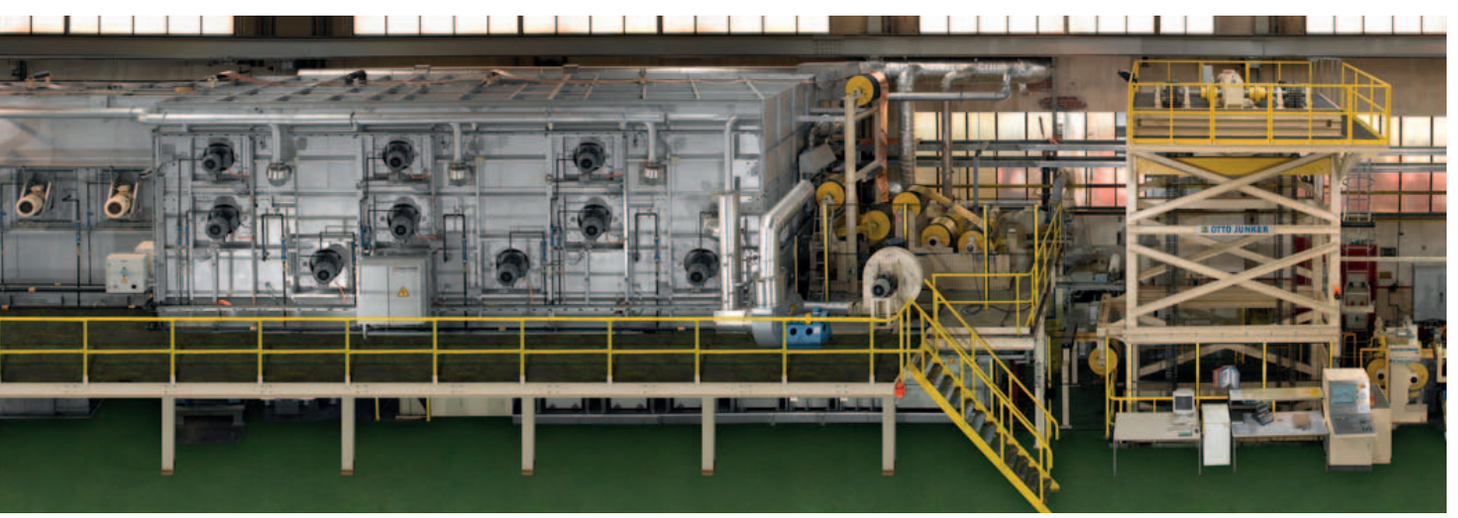
Strip flotation furnace for up to 900 °C | Continuous strip treatment line up to 1,000 °C
Strip width 250 – 460 mm | Strip thickness 0.2 – 2.0 mm
Bypassing the furnace for degreasing and pickling operation only | Operation under up to 100 % hydrogen



Vertical furnace systems

Vertical furnace technology is used, apart from strip flotation furnaces, for very heavy strip or high hydrogen content in the furnace atmosphere. Moreover, OTTO JUNKER is your innovative partner when it comes to the modernization of existing vertical-type furnaces. By installing the latest centering nozzle systems, it is possible to ensure a smooth and scratch-free strip passage and high convective heat transfer. Worldwide references confirm that new OTTO JUNKER technology can deliver a significant performance increase both on existing and on third-party equipment.

Strip width 600 – 1,250 mm | Strip thickness 0.3 – 6 mm | High temperature furnace up to 1,000 °C
Coil weight up to 25,000 kg | Bypassing the furnace for degreasing and pickling operation only



Continuous strip treatment line for degreasing, pickling and passivating

Degreasing

Before heat-treatment in the furnace, the strip must be cleaned to remove the rolling oil or emulsion applied in the preceding rolling process. Referred to as “degreasing“, this step is critically important for the quality of the annealed strip as even minor quantities of oil or emulsion residue may produce undesirable discoloration of the strip surface and hence, quality loss.

Modular equipment technology

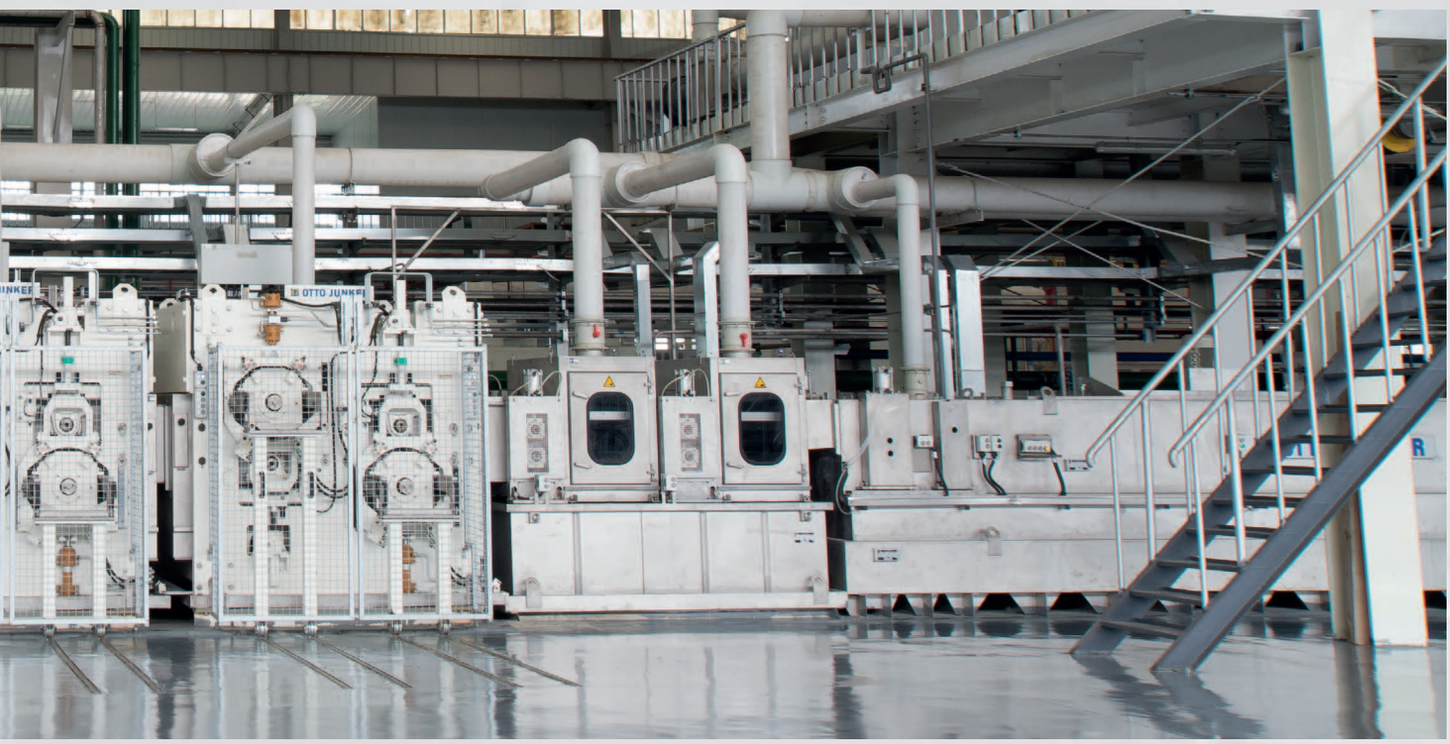
Owing to the modular design of its diverse equipment systems, OTTO JUNKER can adapt the degreasing and pickling process perfectly to each customer‘s strip production requirements:

- high-pressure spray chambers
- squeegee rolls with different rubber and nonwoven fabric linings
- “light-duty“ brushing machines for strip degreasing
- “heavy-duty“ brushing machines with two-sided shaft support
- spray chambers for cold and hot rinsing
- high-pressure edge blow-off
- blow-out of stitched strip joints
- hot air dryer
- cascade operating modes for improved economy
- acid-resistant steel housings for long lifetime
- approved specialist company acc. to §62 and §63 of the German Water Management Act

Pickling and passivating

After the annealing process the strip is pickled to remove any remaining oxide deposits from its surface. Depending on customer preferences, OTTO JUNKER offers both flush and spray pickling systems, both of which can be further customized to suit the application.

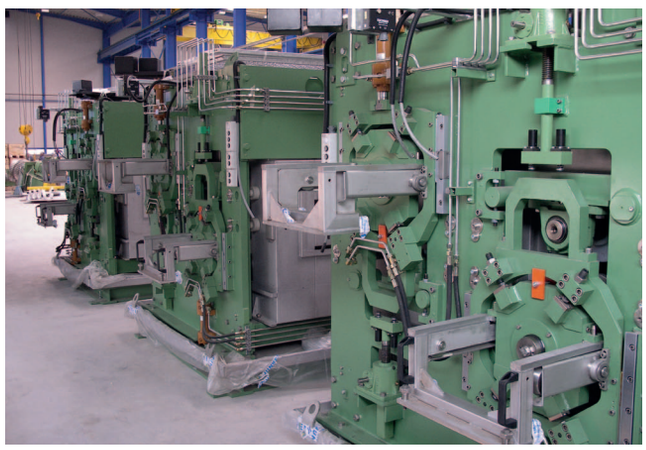
The downstream finish-brushing machines create the customer-specific surface finish, using brushes with a fill material adapted to the given product. In order to avoid premature re-oxidation of the bare metal, the strip is passivated and dried in a spray chamber before it is wound into coils again.

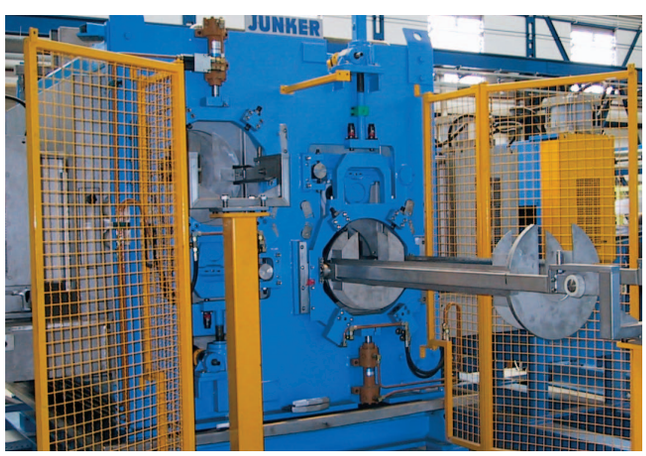


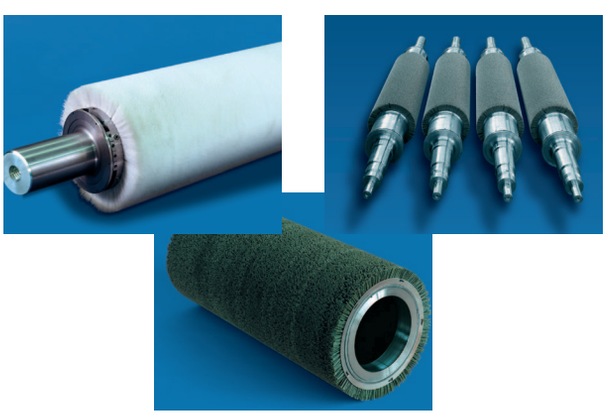
Brushing machines for strip degreasing and finishing tasks

OTTO JUNKER develops, designs and builds all components for its copper strip treatment systems in-house. Thanks to their modularity, the individual assemblies can be combined so as to suit specific customer production requirements.

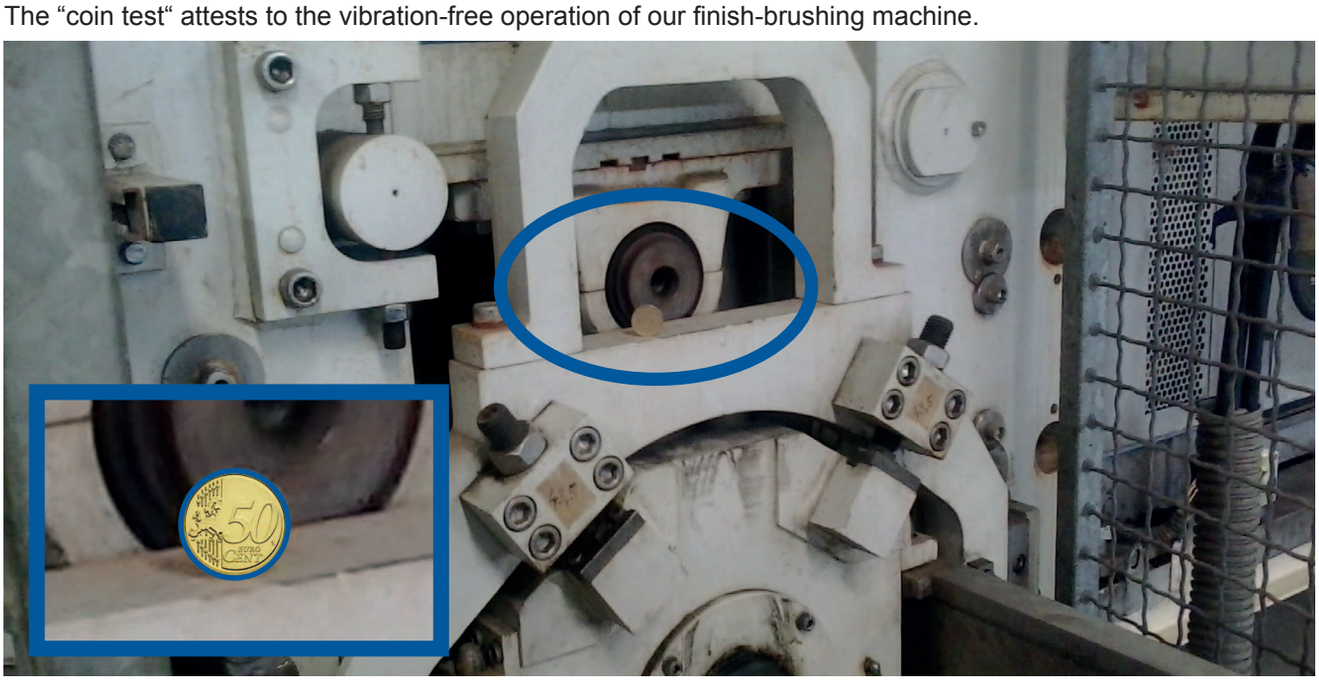
Thus, there are special brushing machines for degreasing as well as a heavy-duty version for strip finishing tasks. These finish-brushing machines are equipped, e.g., with a brush quick-change device and an automatic contact pressure control feature to compensate for brush wear. One essential benefit of this technology is that it supports a vibration-free brushing operation without any counterbalance weights.







The “coin test“ attests to the vibration-free operation of our finish-brushing machine.

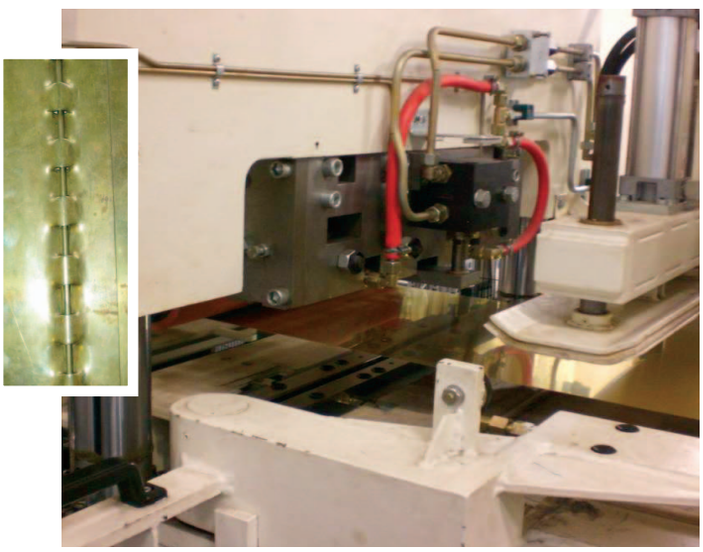


Strip joining systems

OTTO JUNKER supplies the right joining technique for every strip range:

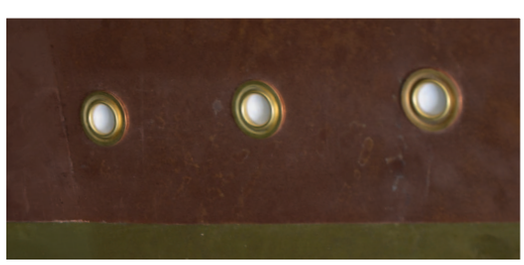
Stitcher

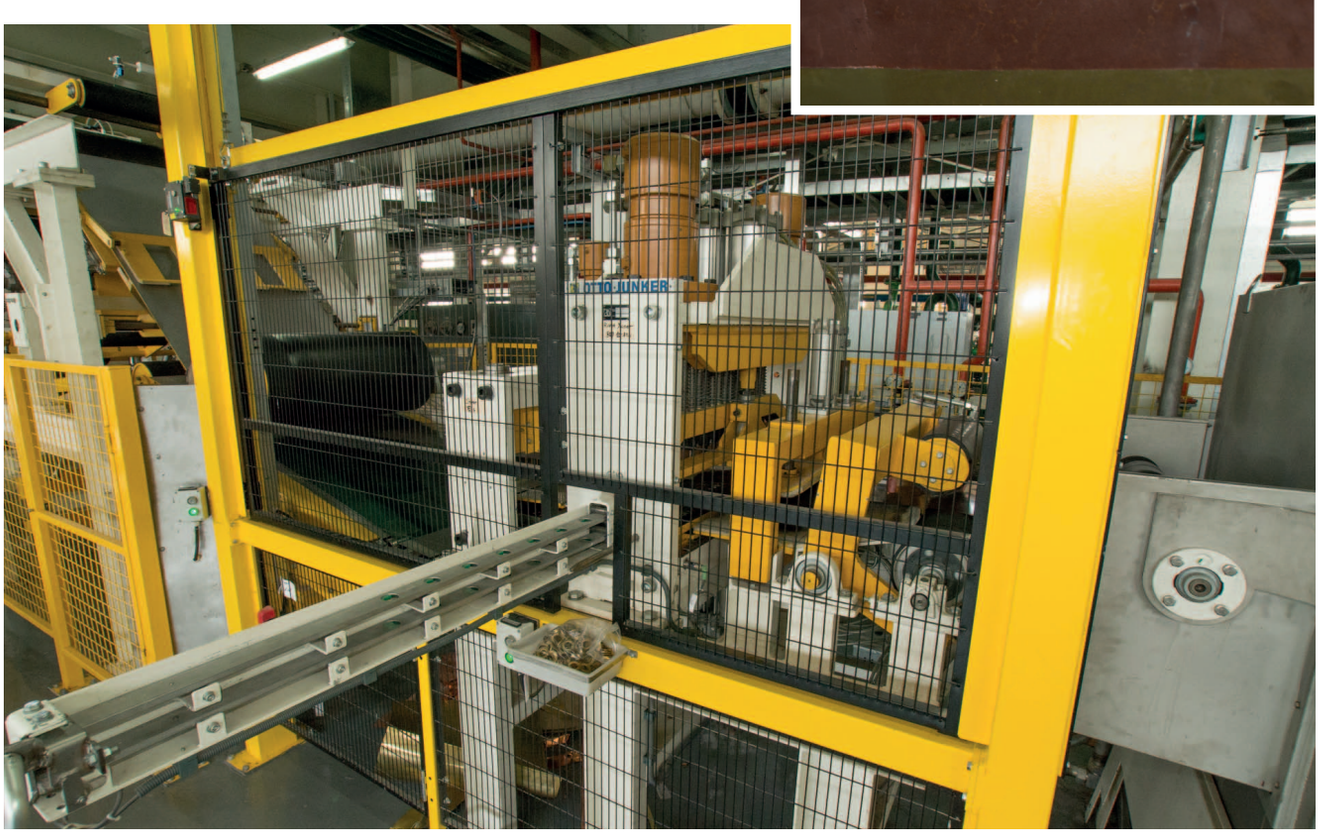
- for heavy-gauge strip up to 4 mm strip
- for high strip tensions
- additional wire connection for dual safety
- easy to operate
- low maintenance



Eyeletting / rivlet joiner:

- especially for light-gauge strip
- 0.05 - 1.2 mm strip thickness
- gentle on rolls
- low fluid carryover
- very simple and quick joining process





Coiling equipment

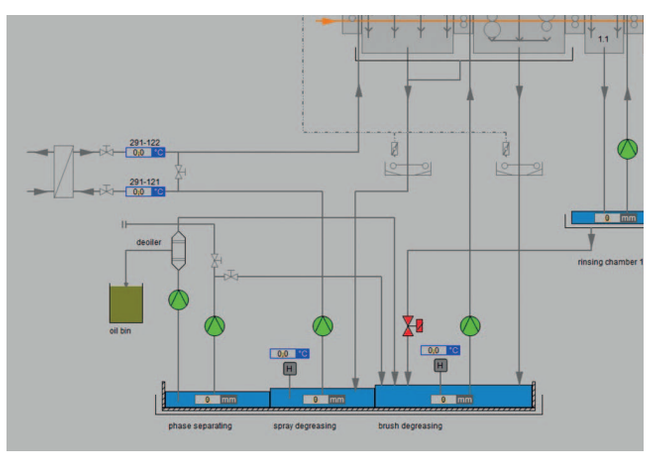
When it comes to ensuring a continuous, high-throughput production process, the coil-handling system plays an important role. OTTO JUNKER supplies its own decoiling / recoiling systems which minimize coil change times:

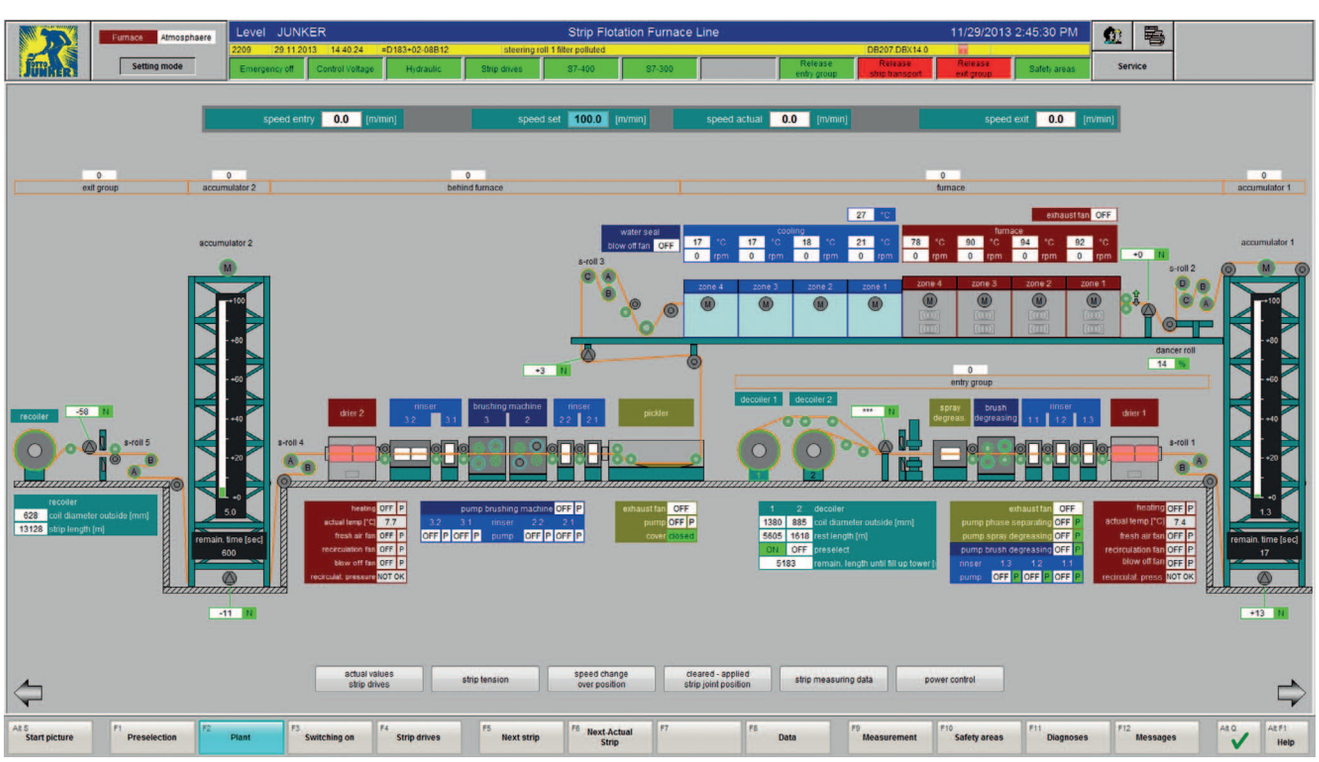
- loading of coils on jack pad
- coiler mandrels for use of spools and/or clamping slot
- fully automatic spool loader
- automatic coil start with belt wrapper
- paper winder
- turning reel
- strip accumulators with rope suspension
- shears
- strip joint tracking

Automation technology

Control reliability and ease of operation are key to achieving high product quality and maximum throughput. OTTO JUNKER equipment benefits from our many decades of equipment commissioning experience which is reflected in the software, hardware and automation engineering of every new installation.

- Schematic screens in the visualization system keep the operator updated on the production process and functioning of each equipment component.
- Permanent process data logging for quality assurance.
- Interfacing with higher-level IT systems (level 3).





Hot-dip tinning lines

Since 1989, OTTO JUNKER has been developing and installing hot-dip tin coating equipment worldwide, mainly for the international connector market.

Advantages

- Formation of an intermetallic phase between the tin and the copper-based strip without any additional reflow process
- Finish with preferred tin whisker mitigation practices according to iNEMI-Recommendations, 12-1-06
- Use of tin alloys is supported
- Low energy consumption
- Broad range of coating gauges
- Suitable also for coatings thicker than 3 – 4 µm
- Less porosity than with electrolytic tinning
- Entire equipment from one source

Additional equipment

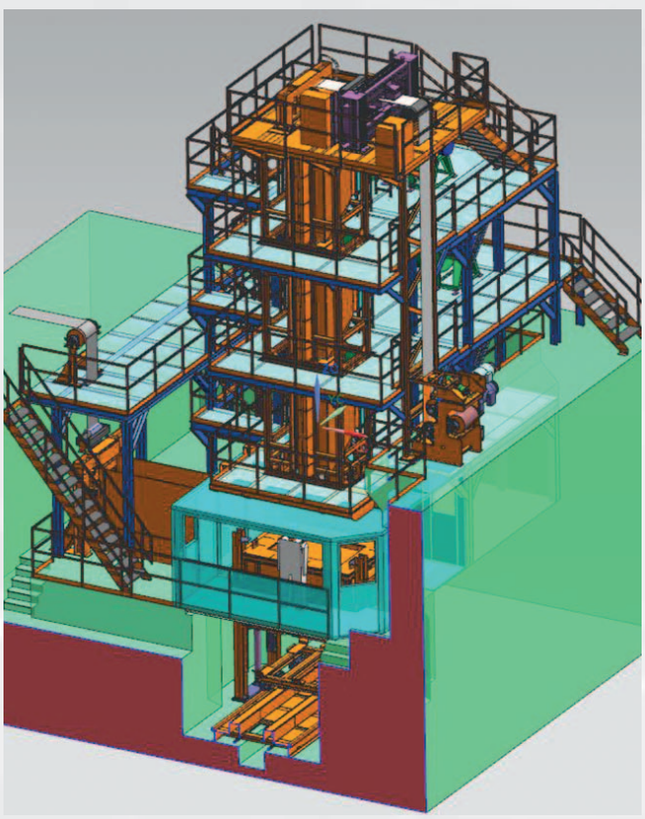
- Reflow furnaces for electrolytic tinning lines


KMD Precise Copper Strip Henan Ltd


Anhui Xinke New Materials Stock Co., Ltd

Process technology

OTTO JUNKER‘s Technology Center comprises a pilot-scale tin coating system for basic research activities. It can be used for process study and also to investigate fluid flow and thermal behaviour.
Where required we can adapt this equipment to your specific needs.



Technology and environment

In the development of OTTO JUNKER strip treatment lines, it has always been a major consideration that their operation should be consistent with a sparing use of resources.

For this reason, the component assemblies employed and those developed by OTTO JUNKER have come to define, as a matter of course, the state of the art in strip treatment technology.

- energy-saving recuperative burner for reduced CO_2 emission
- heat recovery from cooling zones and exhaust gas
- pickling fluid cleaning and reconditioning
- minimized product waste through continuous system operation
- cascade arrangement of rinsing stages
- internal DC link circuit for strip transport motors
- certified according to AM, EM, UM, OHSAS 18001, ISO 50001, ISO 14001
- ISO 9001

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