METALS
PROCESSING LINES
ALUMINUM
Continuous annealing and processing line for automotive sheets
Lightweight aluminum trends for the automotive, aerospace, and defense industries

ADVANCED MATERIALS OF FIRST-CLASS QUALITY
Automobile manufacturers are moving to make cars lighter, to reduce weight and CO₂ emissions, and to extend the range of electric vehicles. Different aluminum alloys provide excellent properties for deep-drawing and high strength for crash performance. First-class corrosion resistance and its efficient recyclability are additional benefits of using aluminum for car bodies and panels. The excellent properties of the aluminum are also valued by the aerospace and defense industries. In addition, aluminum has established itself as the best material for food and beverage cans, solar technology, and in the construction industry.

ANDRITZ offers and continues to develop technology for high-quality aluminum sheet, with first-class mechanical properties and surface pre-treatment according to automotive customer specifications.
Continuous annealing and processing lines: All processes from a single source – a fully integrated line

**HIGH PRODUCTION CAPACITIES AND FULL AUTOMATION**

The continuous annealing and processing line (CALP) combines two processes in a single, fully automated line: heat treatment and surface treatment. Another option is two separate lines: a continuous heat treatment line (CHTL) and an automotive surface treatment line (ATL).

Heat treatment of aluminum alloys, annealing (O) or solution heat treatment (T4, T6), requires high temperatures above 500° C close to the melting point of aluminum alloys. In the floating type furnace, the strip is guided through at minimum strip tension.

ANDRITZ has demonstrated excellent strip guiding capabilities in our reference lines and is one of the few suppliers capable of providing all processes required for aluminum strip from a single-source.

The entry section operates fully automatically, with optimized scrap handling. The strip head and tail are joined using the well-established stitching technology. Our proprietary form-fit bending machine feeds a flat strip to the floating furnace. Annealing and heat treatment are followed by water quenching, which allows production of high-strength and high-ductility alloys suitable for heat treatment. Air quenching returns the coils to room temperature. ANDRITZ tension levelers are available with steel cassettes or PU rolls and level the quenched strip effectively at controlled elongation rates.

In the exit section, the strip surface is inspected automatically and marked according to OEM requirements. The ANDRITZ recoiling temperature model controls the pre-aging furnace and the temperature at the recoiler. The level 2 system provides set-points for all process sections as well as the electrostatic oiler. Oil and hot melt (dry lube) film thicknesses are monitored online. The exit section operates fully automatically using the high-speed exit shear to cut samples or for production of daughter coils.

Many years of experience provided by our engineers, the continuous further developments in our technologies, and the comprehensive, certified quality management system are proof of ANDRITZ’s leading role in the world market. Core components are developed in-house and manufactured at the company’s own facilities. Our specialties are complete customized plants as well as extension or modernization projects. Our experienced on-site supervision and commissioning teams manage greenfield, brownfield, and turnkey installation and commissioning. Our experts provide operator training and assistance to ramp-up production efficiently within tough time schedules.

**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Material</th>
<th>Aluminum and aluminum alloys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strip thickness</td>
<td>0.2-5.0 mm</td>
</tr>
<tr>
<td>Strip width</td>
<td>800-2,350 mm</td>
</tr>
<tr>
<td>Line speeds</td>
<td>120 m/min. max. in processing section</td>
</tr>
<tr>
<td></td>
<td>200 m/min max. in entry and exit sections</td>
</tr>
</tbody>
</table>

**HIGHLIGHTS**

- Full automatic entry and exit section
- Stitcher with integrated lubrication
- References with high-capacity floating furnace
- Excellence in surface treatment technology
- Recoiling temperature model
Automotive surface treatment lines: Perfection in surface treatment technology

PERFORMANCE IN PAINTABILITY, WELDABILITY, AND CORROSION RESISTANCE
Automotive sheet requires cleaning (degreasing), pickling (de-oxidizing), and conversion (passivation). All of these processes are integrated into the CALP line and react with high flexibility to the changing line speeds determined by the heat treatment furnace. Another option is a stand-alone automotive surface treatment line (ATL). Different demands for final surface properties by the OEMs worldwide require the right process technology.

ANDRITZ provides spray, immersion, and roll-coater technology.

The degreasing section requires spray technology for excellent cleaning performance. Spray or immersion treatment is available for the pickling process. The coating weight in spray and immersion conversion sections is controlled by flexible contact times. The roll-coater controls the wet film thickness, which is dried and bonded to the strip surface in the subsequent Peak Metal Temperature (PMT)-Dryer. Our level 2 automation system enables automatic selection of the required surface treatment process and provides it with the optimum set-points to achieve high-performance pickling and conversion.

Spray pickling and conversion section
ANDRITZ has minimized environmental impact with a highly efficient rinsing section design, improved bath maintenance (filter, oil separator, and membrane technology), and closed loop technology using reverse-osmosis and ion-exchange. Any remaining waste water streams are treated in our state-of-the-art waste water treatment plants.

**HIGHLIGHTS**

- Highly efficient degreasing and cleaning process
- Flexible pickling control by contact time
- Alcoa 951 pre-treatment references
- Accurate and uniform application of conversion layer
- Fast and automatic conversion product change
- Easy spray bar removal
- Quick squeeze roll changing
- References with stainless steel and polypropylene treatment tanks
- Waste water treatment
- Utility supply (DI water, hot water boiler)
Multi-function lines for aluminum strip: Recoiling, edge trimming, tension leveling, slitting, and inspection

DIFFERENT PROCESS STEPS — ALL IN ONE LINE

Different process steps are needed in the production of finished aluminum strip in order to meet the demands of the market. The new ANDRITZ multi-function plant meets these demands.

Recoiling, edge trimming, tension leveling, inspection, and slitting in one line: High throughput and multiple functions are not a contradiction in terms here. These stringent demands can be met with an intelligent layout of the individual functions within the overall plant. From manual inspection to automatic surface checking, from edge trimming to slitting, from leveling of the leading strip end to precision tension leveling. All this at strip speeds of up to 1,000 m/min.

Perfected plant engineering technology with intelligent automation solutions from a single source. The plants we have supplied worldwide are proof that we meet our customers’ demands with custom tailoring.

TECHNICAL DATA

<table>
<thead>
<tr>
<th>Material</th>
<th>Aluminum and aluminum alloys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strip thickness</td>
<td>0.15-3.5 mm</td>
</tr>
<tr>
<td>Strip width</td>
<td>800-2,650 mm</td>
</tr>
<tr>
<td>Coil diameter</td>
<td>2,800 mm max.</td>
</tr>
<tr>
<td>Coil weight</td>
<td>30,000 kg max.</td>
</tr>
<tr>
<td>Plant operating speed</td>
<td>1,000 m/min. max.</td>
</tr>
</tbody>
</table>
Coiler area of an edge trimming, slitting, and tension leveling line

Tension leveling and finishing line
Aluminum sheets and strip for industrial applications and for the aeronautical industry are cut to the required shape on ANDRITZ cut-to-length lines. These lines can process coils or plates with a strip width of 2,850 mm, up to 24 m in length, and with strip thicknesses of 0.8–15 mm. The lines are equipped for edge trimming, recoiling, precision-leveling, and cutting-to-length processes with all the necessary units, such as decoilers, edge trimming shears, precision-leveling machine with exchangeable cassettes, recoilers, cut-to-length shears, or vacuum transfer stacking system.

### TECHNICAL DATA

<table>
<thead>
<tr>
<th>Material</th>
<th>Aluminum and aluminum alloys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength</td>
<td>max. 500 N/mm²</td>
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<tr>
<td>Strip thickness</td>
<td>0.8–15.0 mm</td>
</tr>
<tr>
<td>Strip width</td>
<td>900–2,850 mm</td>
</tr>
<tr>
<td>Coil outer diameter</td>
<td>1,100–2,200 mm, with and without sleeves</td>
</tr>
<tr>
<td>Coil inner diameter</td>
<td>610 mm</td>
</tr>
<tr>
<td>Coil weight</td>
<td>22,000 kg</td>
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<tr>
<td>Sheet length</td>
<td>1,000–15,000 mm</td>
</tr>
<tr>
<td>Stack height</td>
<td>1,500 mm max.</td>
</tr>
<tr>
<td>Stack weight</td>
<td>10,000 kg max.</td>
</tr>
<tr>
<td>Plant operating speed</td>
<td>30 m/min. max.</td>
</tr>
</tbody>
</table>
Multi-blanking line with automatic knife changing for the slitting shears

Cut-to-length line
Electrical and automation equipment for the metals industry

COMPLETE PROCESS AUTOMATION AND PRODUCTION OPTIMIZATION
ANDRITZ supplies complete electrical equipment with drives, automation systems, instrumentation, level 2 systems, and all the required technological control systems (TCS).

The close cooperation between mechanical, process and electrical/automation engineering at ANDRITZ has proved to be a very big advantage.

Precise and comprehensive knowledge of the line and process technologies combined with many years of practical experience have resulted in ingenious solutions enabling our customers to produce top-level products in terms of quality and productivity.

DATA ANALYTICS, MATHEMATICAL MODELS, AND SIMULATION
- Production optimizer: production planning tool for optimizing the material sequence
- Plant simulation (ghost coiling, 3D line simulation, virtual operator training)
- Fully automatic entry and exit section
- Fully integrated exit strategy
- AFC – Advanced Furnace Control
- Recoiling temperature model
- Data analytics for process optimization
- Predictive maintenance system

HIGHLIGHTS
- Complete automation systems for strip transport and process control
- Manufacturing Execution System (MES) & Mill Management System (MMS): Level 2 system with coil tracking function, model integration, Primary Data Input (PDI) system, roll management, different reporting and management functions, interface to level 3 system
- Platform-independent level 1 software (Siemens, Rockwell, ABB, B+R, Yokogawa, ...)
- Multi-drive systems for low-voltage and medium-voltage drives with common DC bus
- System integration for instrumentation and package unit
- Automatic mill gauge control (AGC)
- Remote maintenance
- Production assistance
Experience and excellence worldwide

A FEW OF OUR REFERENCES

<table>
<thead>
<tr>
<th>Customer</th>
<th>Reference</th>
<th>Capacity</th>
</tr>
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<tbody>
<tr>
<td>Constellium, Singen, Germany</td>
<td>Extension of annealing line 8</td>
<td>15,000 t/a</td>
</tr>
<tr>
<td>AMAG rolling, Ranshofen, Austria</td>
<td>Extension of annealing line</td>
<td>15,000 t/a</td>
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<tr>
<td>Aluminum producer, IA, USA</td>
<td>Automotive treatment line</td>
<td>100,000 t/a</td>
</tr>
<tr>
<td>Aluminum producer, IA, USA</td>
<td>Continuous heat treatment line</td>
<td>100,000 t/a</td>
</tr>
<tr>
<td>Aluminum producer, TN, USA</td>
<td>Continuous heat treatment line</td>
<td>150,000 t/a</td>
</tr>
<tr>
<td>Constellium-UACJ, KY, USA</td>
<td>Cont. annealing and processing line</td>
<td>110,000 t/a</td>
</tr>
<tr>
<td>Constellium, Neuf-Brisach, France</td>
<td>Cont. annealing and processing line</td>
<td>110,000 t/a</td>
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<tr>
<td>Aluminum producer, KY, USA</td>
<td>Cont. annealing and processing line</td>
<td>170,000 t/a</td>
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<td>Nanshan Aluminum, Longkou, China</td>
<td>Tension leveling and finishing line</td>
<td>100,000 t/a</td>
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<tr>
<td>Weihai Haixin New Material Co, China</td>
<td>Recoiling and trimming line</td>
<td>265,000 t/a</td>
</tr>
<tr>
<td>Zhongwang Aluminum, Tianjin, China</td>
<td>Tension leveling and finishing line</td>
<td>90,000 t/a</td>
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<tr>
<td>ELVAL Aluminum, Oinofita, Greece</td>
<td>Revamp of cleaning and pickling</td>
<td>100,000 t/a</td>
</tr>
<tr>
<td>Constellium, Neuf-Brisach, France</td>
<td>Completion line</td>
<td>110,000 t/a</td>
</tr>
<tr>
<td>Constellium-UACJ, KY, USA</td>
<td>Completion line</td>
<td>110,000 t/a</td>
</tr>
<tr>
<td>Aluminum producer, IA, USA</td>
<td>Slitting line</td>
<td>150,000 t/a</td>
</tr>
</tbody>
</table>
OUR EXPERTISE IS THE WAY TO YOUR SUCCESS

Numerous customers worldwide rely on our technology for first class quality, minimal utilities consumption, and an ensured environmentally-friendly process.

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