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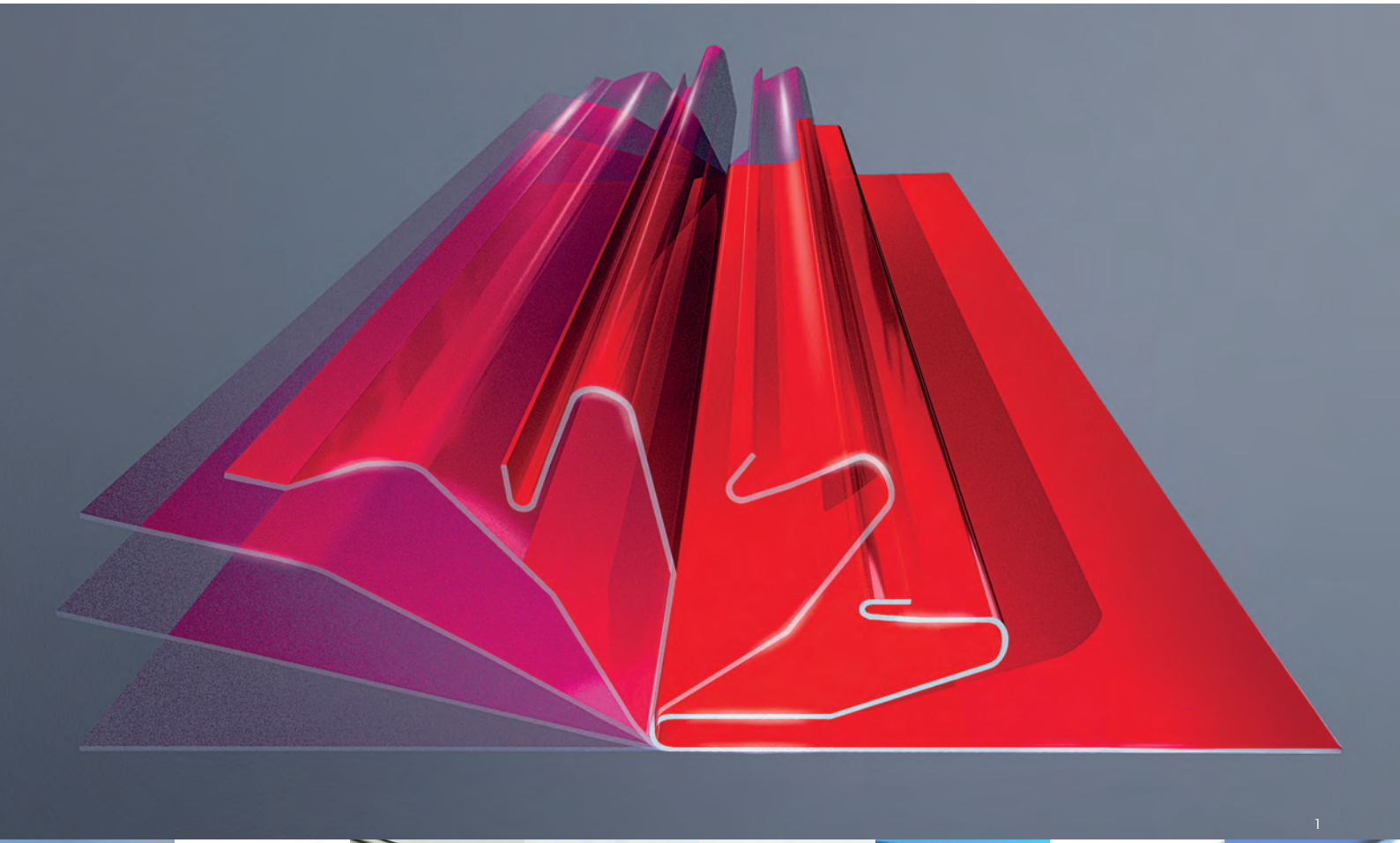
European Cold Rolled Section Association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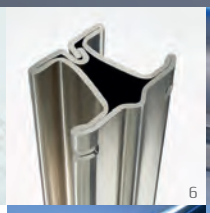
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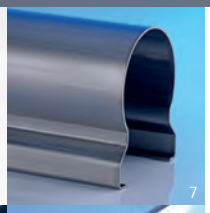
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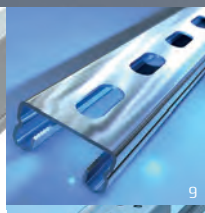
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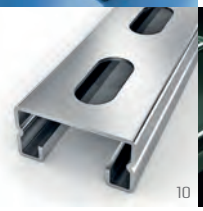
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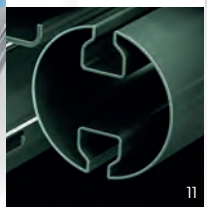
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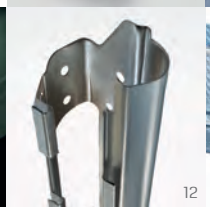
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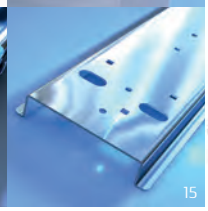
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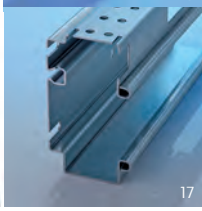
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Roll forming is the future

efficient, innovative and excellent

From cold forming and cold rolling to advanced roll forming

It is difficult to pinpoint the beginning of roll forming to a specific time period. As is so often the case in industrial history, it was a development process that evolved over centuries into the process we know today.

Rolling innovation through the centuries
Cold forming by rolling has a long tradition, with its roots in 14th-century jewelry production. Pioneering concepts like Leonardo da Vinci's rolling mill sketches in the early 16th-century laid the groundwork for today's advanced processes. The first cold-rolled sheet metals – used as base materials – were produced in the prospering industrial nations towards the end of the 17th century. In this early phase of industrialization, they served as precursor material for various machines and products in the booming textile industry, which was important and technologically advanced at this time.

Rising demand shapes the future production process
The increasing adoption of roll forming processes for the serial production of long products began with the second industrial revolution in the late 19th century. As automation advanced, the need to supply raw materials, transportation, clothing, and food to a rapidly expanding population laid the foundation for the continuous evolution of innovative production processes.

Key developments in recent decades
The first roll forming machines for more complex profile geometries emerged in the 1950s. Over the following decades, small, manually operated rollers developed into increasingly powerful roll forming systems with additional auxiliary equipment and the first digital controls towards the end of the century. Today roll forming has developed into a state-of-the-art supply industry delivering ready-to-install components with custom-engineered properties.

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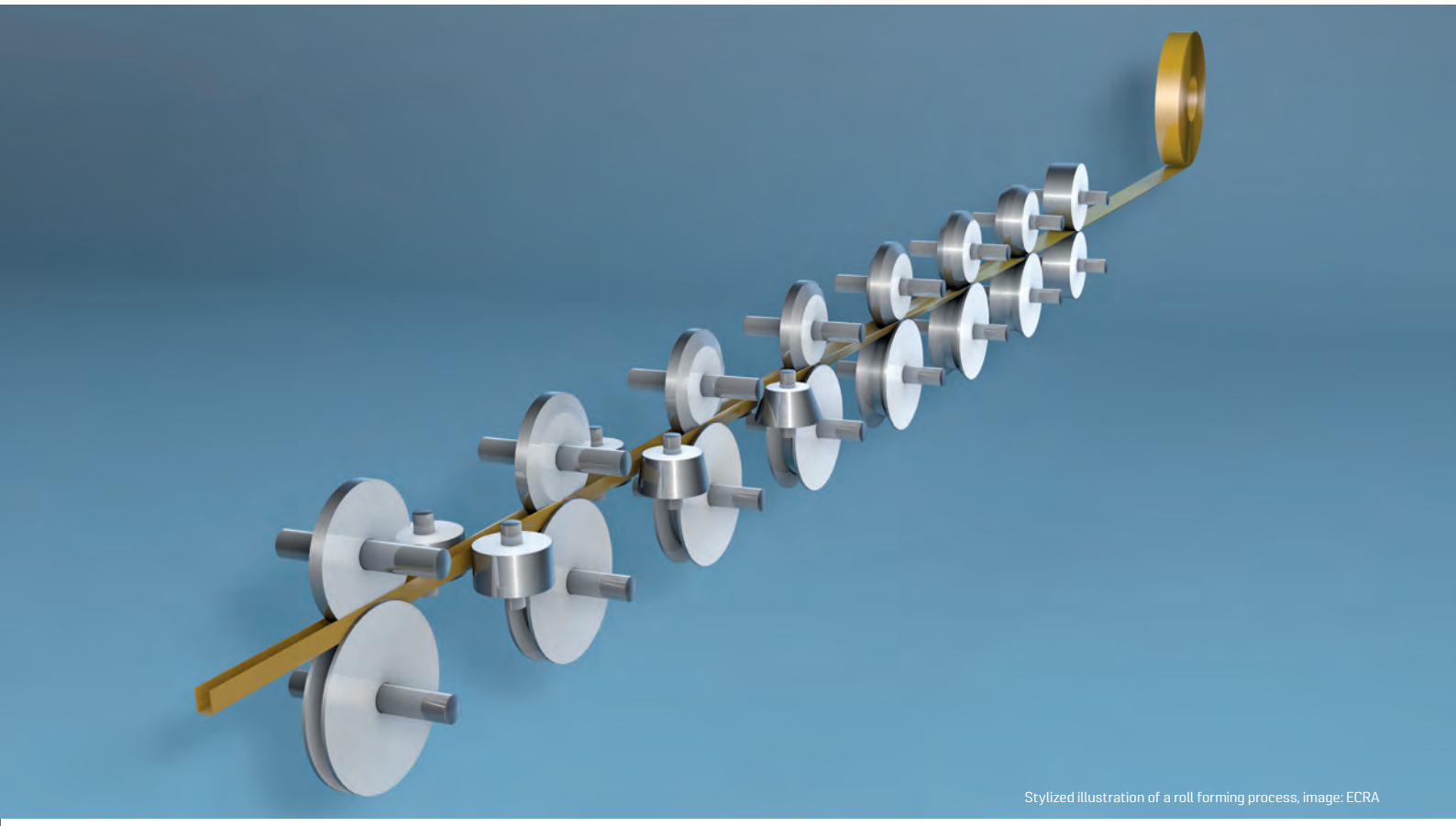

Stylized illustration of a roll forming process, image: ECRA

Roll forming – A precision process for high-volume profile production

Roll forming is an industrial process for producing open and closed profiles through a multi-stage, continuous bending operation. Forming is carried out incrementally as the material passes through several pairs of driven forming rolls, each stage progressively shaping the desired profile geometry. Thanks to its high processing speeds, roll forming is particularly well suited for large batch sizes with high output rates. Globally, an estimated 8 to 10 percent of annual steel production – continuing to rise – is further processed through roll forming [1,2].

Over the course of decades, many medium-sized European companies have built up deep process expertise. Depending on the complexity of the final component geometry, up to 70 forming stages may be required to achieve complex shapes and meet tight tolerance specifications [3]. Roll-formed profiles are used across all major industries, including automotive, furniture and construction. Due to its high production output and excellent dimensional accuracy, the roll forming process clearly sets itself apart from other manufacturing methods.

[1] Scherble, Heinz: Lasergeschweißte Profilrohre und Verbundprofile. In: Institut für Produktionstechnik und Umformmaschinen (Hrsg.): Tagungsband zur 3. Fachtagung Walzprofilieren, 2002.
[2] Welser Profile GmbH: Leichtbau mit Profilen. In: Blech Rohre Profile, Nr. 3, 2011, S. 32 – 33
[3] Groche, Peter; Müller, Christian: Merkblatt 180: Walzprofilieren von Flacherzeugnissen aus Stahl. Düsseldorf: Stahl-Informations-Zentrum, 2013.

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Cost-effective components through a broad and highly flexible production range

Due to the excellent accessibility of the profile, roll forming lines offer numerous possibilities for integrating additional manufacturing processes directly into the production workflow. This enables the manufacture of highly complex profiles that can be combined with processes such as:

- Punching
- Piercing
- Embossing
- Folding
- Welding
- Laser cutting

These operations can be carried out before, during, or after the roll forming process. Openings or cutouts are frequently integrated to enable fastening, joining, locking, or bearing functions.

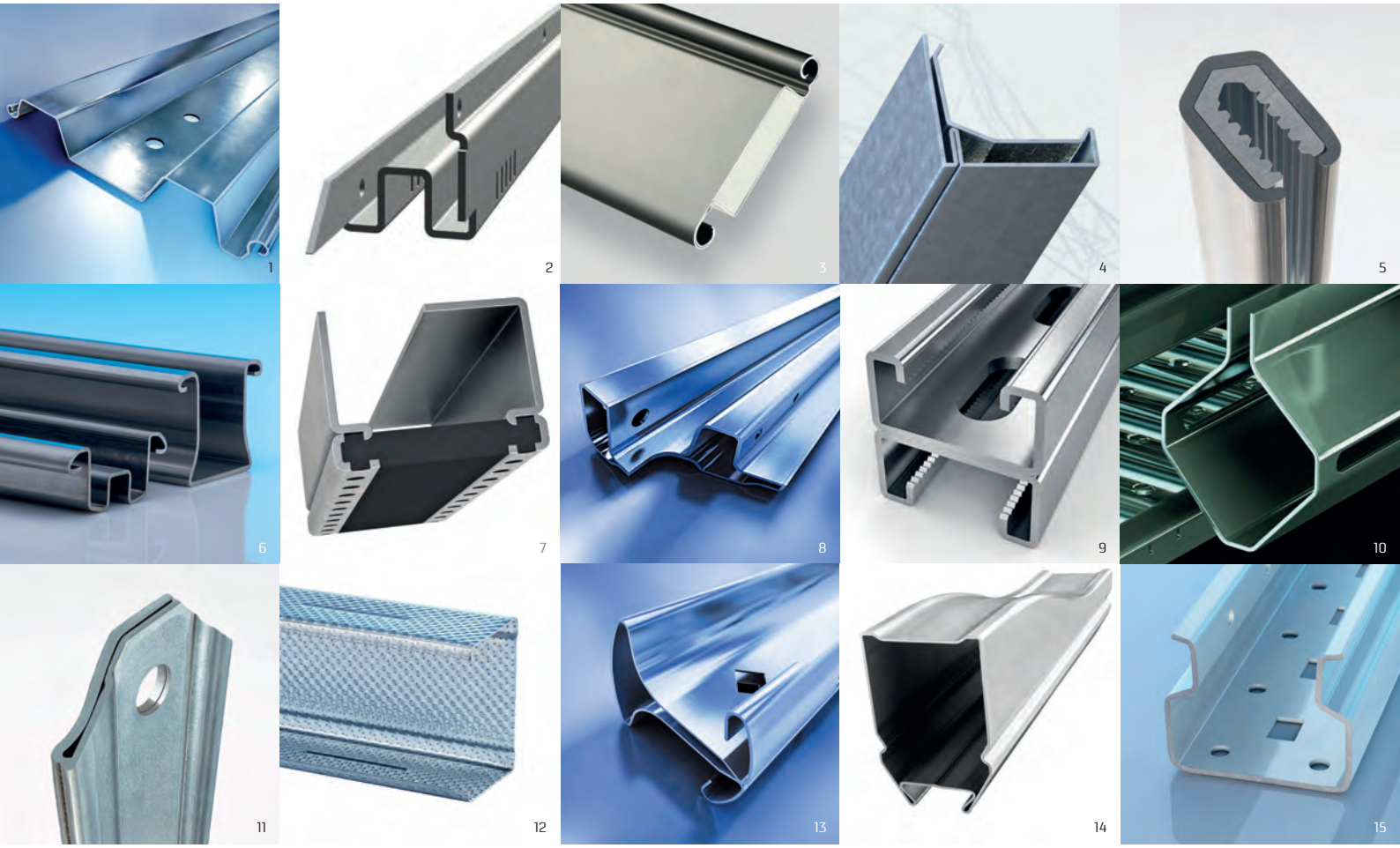


Image 1: Construction industry, Tillmann Gruppe; Image 2: Special profile, BKB Profiltechnik; Image 3: Roll-up door profile, Ferdinand Braselmann; Image 4: Air duct profiles, Stephan Dick Profile; Image 5: Composite profile façade technology, Profilmetall; Image 6: Stainless steel profiles for escalators, Husemann & Hücking; Image 7: Thermally broken profile, Gebhardt-Stahl; Image 8: Laser-welded profile tube, Tillmann Gruppe; Image 9: Installation profile, MFO S.A.; Image 10: Shelving, Hadley; Image 11: Laser-welded cabinet profile, Profilmetall; Image 12: Drywall profile, Saint-Gobain Rigips; Image 13: Laser-welded profile tube, Tillmann Gruppe; Image 14: Height-adjustable profile, Welser Profile; Image 15: Storage systems, Wickeder Profile Walzwerk

The supporting structures of photovoltaic systems are made of roll-formed steel profiles. Image: 176940079 stock.adobe.com

Roll forming improves environmental performance

- Roll forming processes offer an exceptionally favorable environmental footprint.
- Conventional roll forming achieves extremely high material utilization– almost 100% – due to the nature of the process.
- Material waste is limited to setup phases, such as tool or coil changes.
- This high material efficiency is only marginally reduced by integrated operations such as punching.

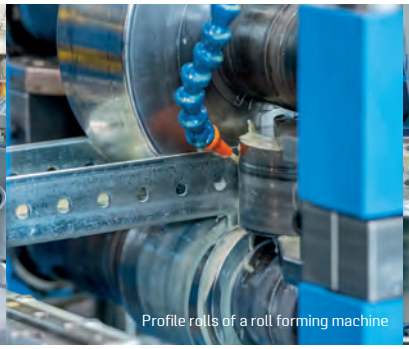
Steel is by far the most widely recycled material in the world. It maintains its mechanical properties even after multiple recycling cycles, making it an endlessly reusable resource. Each cycle further reduces its environmental footprint. Roll forming complements these material advantages with excellent energy efficiency: the process takes place at room temperature, eliminating the need to heat the sheet or coil material.

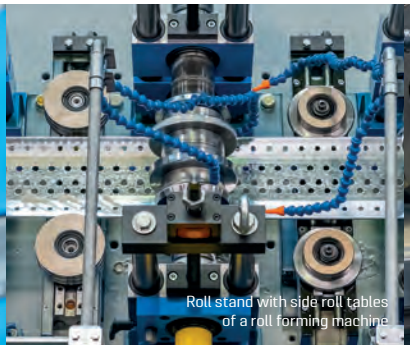
With optimized tool design, low friction losses ensure maximum energy efficiency in roll forming. Thanks to high rolling friction and minimal contour-induced sliding friction, the use of lubricants can often be reduced – or replaced entirely by targeted minimal quantity lubrication. With the ongoing development of climate-neutral, hydrogen-based steel production, the environmental performance of roll forming will improve even further.

Shaping the future: Roll forming meets today's challenges with innovative solutions

Climate change, demographic shifts, and digital transformation define today's challenges. But what do these developments mean for the future of roll forming? Understanding the challenges and turning them into technological innovation is key to shaping the path forward for this versatile and sustainable manufacturing process.


Strip accumulator of a roll forming machine

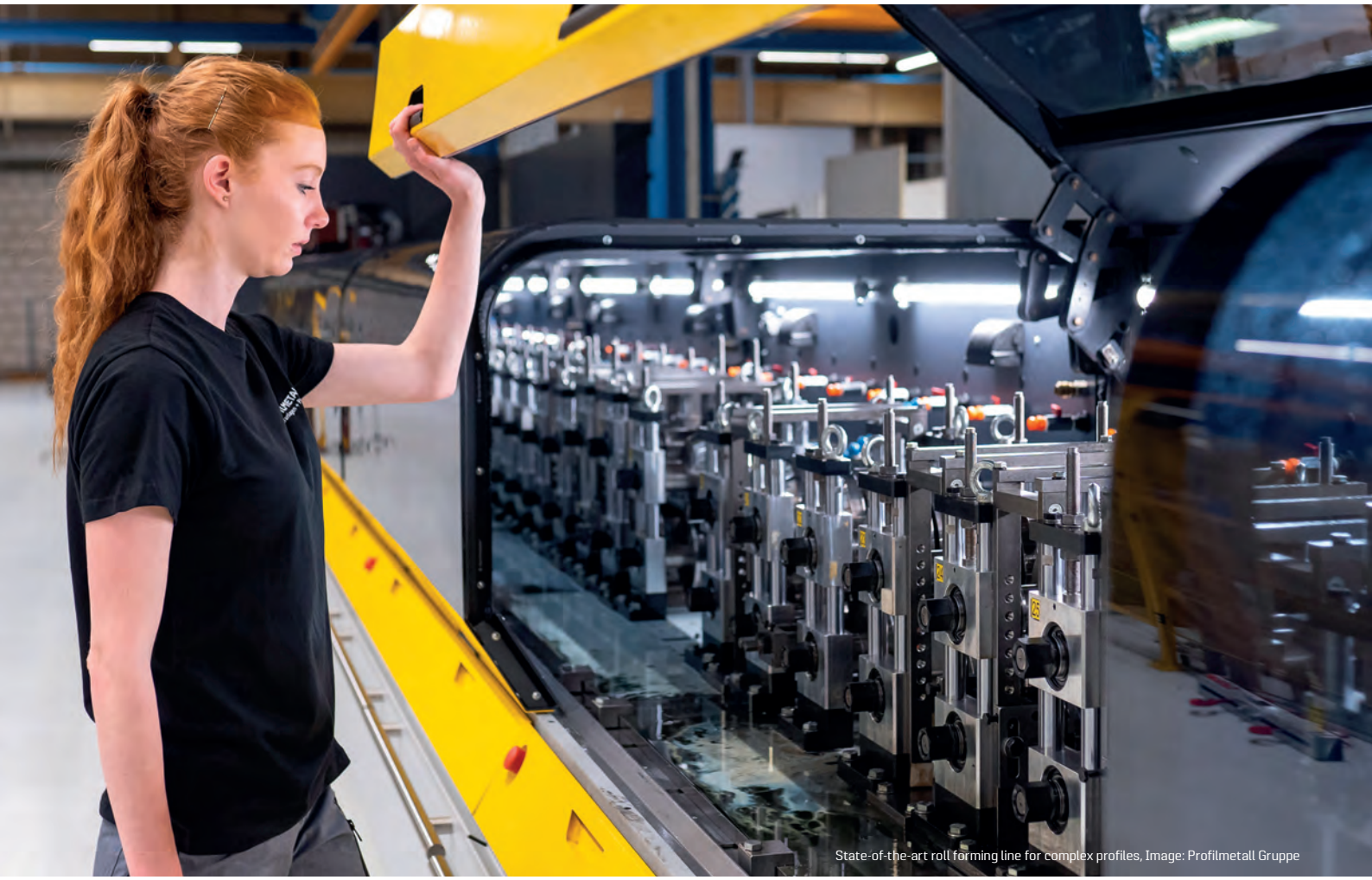

Profile rolls of a roll forming machine


Roll stand with side roll tables of a roll forming machine


Profile rolls of a roll forming machine
Images: Wickeder Profile Walzwerk GmbH

Roll forming: The smart solution for tomorrow's manufacturing

- Roll forming is constantly advancing to meet rising quality demands with precision and consistency.
- As industries move toward greater automation, roll forming keeps pace with intelligent processes and ever-increasing accuracy.
- The industry is continually unlocking innovative process advantages.
- From high-strength steels to non-ferrous metals and specialty alloys – roll forming offers maximum material flexibility.
- With a broad range of customization options, roll forming enables rapid and flexible product and variant changes to meet dynamic market needs.



State-of-the-art roll forming line for complex profiles, Image: Profilmetall Gruppe

The roll forming industry actively addresses workforce transformation

- We are developing new training and professional development practices to ensure smooth and efficient production operations.
- We are optimizing HR strategies to boost recruitment and increase employee satisfaction.
- We facilitate cross-generational knowledge transfer—from analog know-how to digital expertise.
- We foster employee engagement with digitalization and proactively address concerns about job security.
- We remain competitive with a sustainable and highly adaptable product portfolio.

The roll forming industry is already creating smart solutions to meet the major technological and societal challenges of our time. With an interdisciplinary approach, innovative concepts such as digital assistance systems have already been realized. In this context, machines do not replace people – instead, humans and machines work hand in hand. For example, industrial mechanics and plant technicians equip systems with sensors and data technology, maintain tooling, and monitor product quality. This synergy between human expertise and intelligent technology paves the way for a forward-looking, future-ready manufacturing process.

The industry association

ECRA – European Cold Rolled Section Association represents European roll forming manufacturers and is headquartered in Düsseldorf, Germany. In addition to advocating for the interests of its members and supporting industrial and SME-related policy initiatives through umbrella organizations, ECRA is also active in public relations and offers legal guidance.
ECRA offers its members a key platform for targeted professional exchange – always in full compliance with the association's internal antitrust compliance guidelines. ECRA and its members are fully committed to upholding these principles in all activities and interactions.

ECRA member companies

Adient Automotive Components GmbH	www.adient.com
BKB Profiltechnik GmbH	www.bkb-profil.com
DICK PROFILE GmbH	www.dick-profile.de
Ferdinand Braselmann GmbH & Co. KG	www.braselmann.de
Gebhardt-Stahl GmbH	www.gebhardt-stahl.de
Hadley Custom Rollform NL B.V.	www.hadleygroup.com
Husemann & Hücking Profile GmbH	www.husemannhuecking.de
Kirchhoff & Lehr GmbH	www.tillmann-gruppe.de
MFO S.A.	www.mfo.pl
Profilmetall GmbH	www.profilmetall.de
Saint-Gobain Rigips GmbH	www.rigips.de
Tillmann Profil GmbH	www.tillmann-gruppe.de
Tillmann Werkzeugbau Profiltechnik GmbH	www.tillmann-gruppe.de
Welser Profile Deutschland GmbH	www.welser.com
Wickeder Profile Walzwerk GmbH	www.wickeder-profile.de
Wilhelm Bertrams GmbH & Co. KG	www.tillmann-gruppe.de

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Cover images: Image 1: Process simulation roll forming, Profilmetall; Image 2: Vehicle construction, Tillmann Gruppe; Image 3: Assemblies, BKB Profiltechnik; Image 4: Roll-up door profile, Ferdinand Braselmann; Image 5: Roller shutter / awning shafts, Stephan Dick Profile; Image 6: Hook-in profile furniture industry, Profilmetall; Image 7: Agricultural vehicle construction, Husemann & Hücking; Image 8: Air duct profile, Gebhardt-Stahl; Image 9: Fastening technology, Tillmann Gruppe; Image 10: Installation profile, MFO S.A.; Image 11: Agricultural industry, Hadley; Image 12: Roll-formed aluminum profile automotive, Profilmetall, Profilmetall; Image 13: Drywall construction, Saint-Gobain Rigips,; Image 14: Components / systems, Tillmann Gruppe; Image 15: Automotive industry, Tillmann Gruppe; Image 16: Industrial scaffolding deck, Welser Profile; Image 17: Conveyor systems, Wickeder Profile Walzwerk

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