WAELZHOLZ

# Flat wire products and profiles

High-performance materials. Unparalleled precision.

# HIGH-TECH FLAT WIRE PRODUCTS AND PROFILES

Customized materials are the foundation for the innovative products of our customers. That's why we develop and produce high-performance flat rolled wire and profiles which can be seamlessly and economically integrated in your processes and help you implement your ideas.

## When degree of flexibility becomes a competitive advantage

Wire products have the longest-standing tradition for us, as Waelzholz started out as a wire processing company. These products have been an essential part of our portfolio for nearly 200 years. Today, all the more, it is the high-tech products with a broad grade spectrum ranging from DC, spring and hardened and tempered steel strip to stainless precision steel strip. This diversity combined with our comprehensive engineering services helps us to meet and even exceed the demanding requirements of our customers again and again. For example, we offer high-precision edges and exceptional material concepts, which even combine opposing properties perfectly.

Being involved in the product and process requirements of our customers early on allows us to achieve high degrees of flexibility through concrete advantages which go beyond simple added value. We offer, for example, products which help you to cut down on time and cost-intensive follow-up processing steps such as edge processing or piece hardening. And that is precisely how we reach our goal: Your competitive advantage.

## Precision in production

Our flat rolled wire production process is one of the most advanced in the world. Using precise, multi-step processes involving rolling and heat treatment, we produce flat wire products from a wide range of materials. And we don't leave anything to chance along the way.

We ensure unparalleled flatness and the highest possible degree of linear straightness through extensive quality assurance processes. Even when it comes to long running lengths without welded seams, we are able to achieve the lowest possible tolerances in the range of just a few thousandths of a millimeter, allowing us to produce strips of up to ten kilometers long in reliably reproducible quality.

# Flat wire products for demanding applications

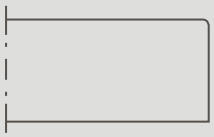
## High requirements for end applications

Many end products such as retractor springs, jigsaw blades or healds must be able to withstand high stress despite their small size. This requires high resistance to wear which must often be combined with good formability. A contradiction our materials experts need to solve time and again.

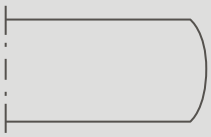
Furthermore, the edges of our flat wire products often play an important and sometimes even functional role in the final part. With our many decades of experience we are able to offer our customers tailored solutions for their specific requirements.

## Customized edge shape

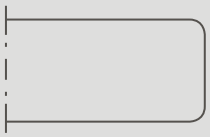
We offer precision edges for every application imaginable: Be it mill edges, horizontally or vertically rolled, chase-threaded or tailor-made according to our customers' specifications. The high degree of accuracy we use to produce edges within the narrowest of tolerances saves our customers time-consuming follow-up processing of the edges in their own production process. True added value.



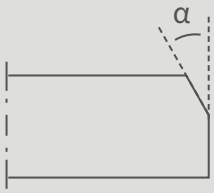
Deburred



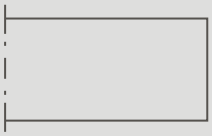
Mill edges, radius undefined



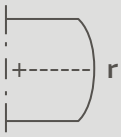
Round, radius defined

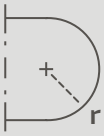



One-sided chamfered edge



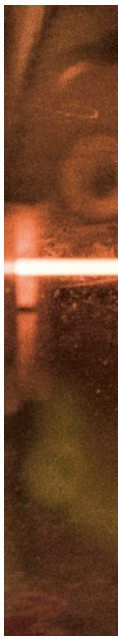
Squared, rolled




Rounded

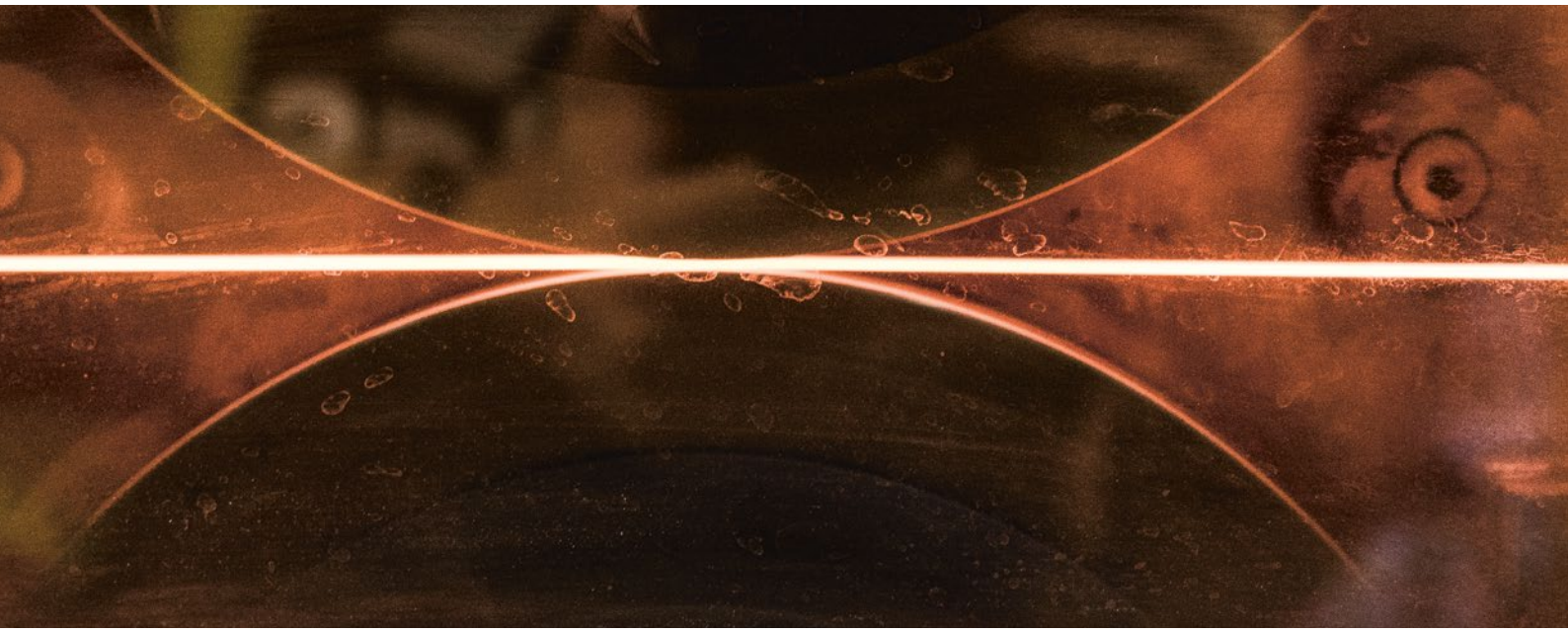
## Constant pressure.
## Safe and reliable.



Wiper blades contribute significantly to safety when driving – if the entire length of the blades is pressed against the complexly curved windshield with high and even contact pressure.

On high-quality wipers this is achieved with a spring strip made of hardened and tempered flat wire integrated into the rubber profile of the wiper. The flat wire product needed is produced by Waelzholz with the exact prestress specified by the customer which remains constant for the entire product life cycle.

**For further information visit**
↗ waelzholz.com/technologies-processes



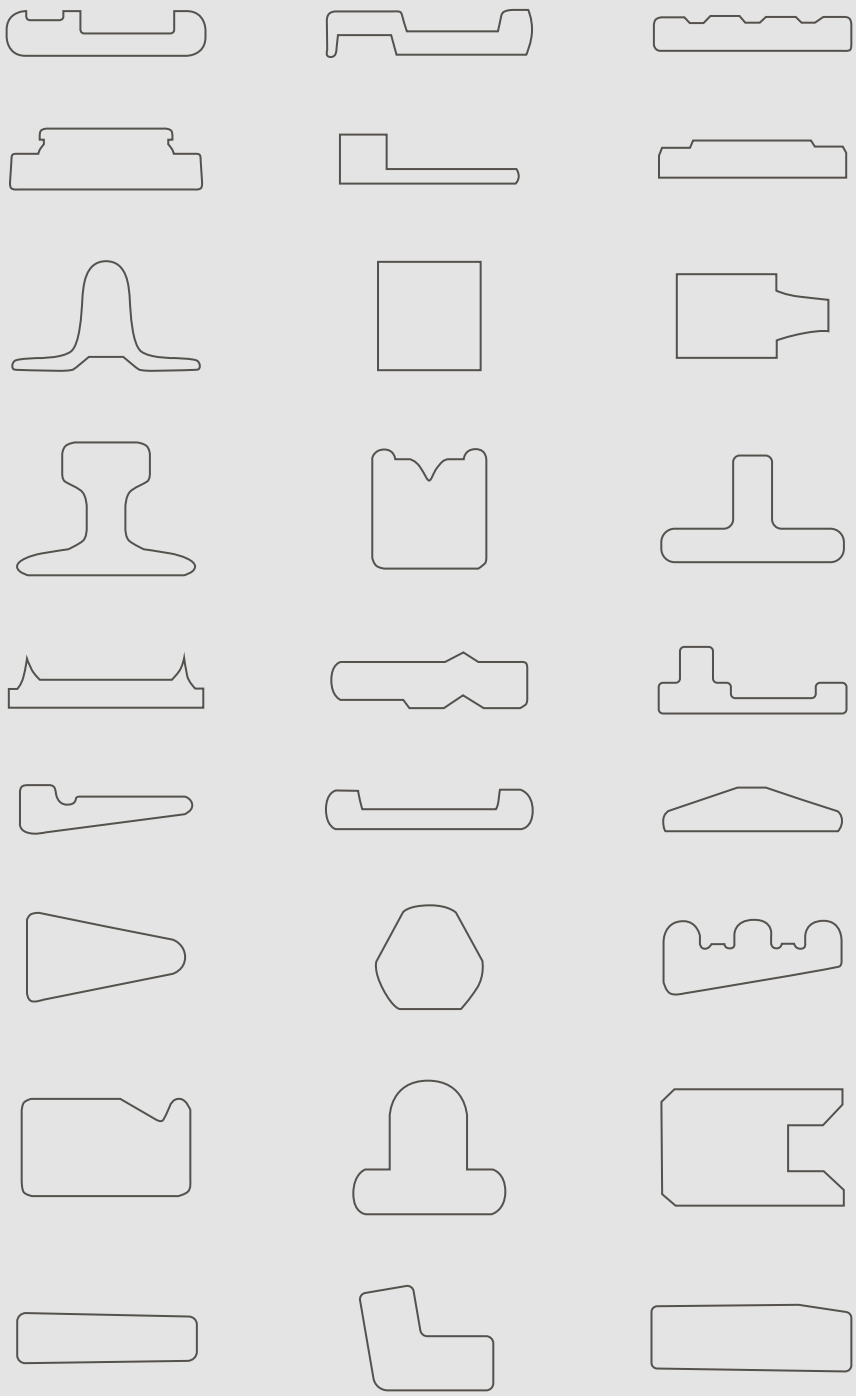
## Top-speed hardening and tempering

A hardened and tempered material with an extremely fine-grained and homogenous micro-structure ensures the prestress of the flat wire product integrated in the wiper blade. This material is created through conductive high-speed hardening and tempering – a special hardening and tempering process developed by Waelzholz: During hardening, the strip is heated to far above 800 °C (1472 °F) in fractions of a second and then rapidly cooled down again. This process is repeated during the tempering step and prevents the formation of large grain in the microstructure. The results of the conductive high-speed hardening and tempering far exceed those of conventional hardening and tempering processes.

Because of the homogenous microstructure, the material not only displays excellent bending properties during further processing by our customers but is also characterized by extremely uniform mechanical properties.

**01** The curved flat wire product in the wiper blade ensures continuous and constant contact pressure of the rubber profile on the windshield through its lasting spring tension.

**02** Conductive high-speed hardening and tempering: To harden the material, the flat wire product is quickly heated to above 800 °C (1472 °F) and then rapidly cooled down again.



# PROFILES IN TOP SHAPE

**Diversity in shape and performance**

We produce customized profiles out of round wire or hot rolled steel strip on high-performance profile tandem cold rolling mills. Tried and tested rolling and heat treatment processes ensure constant dimensional tolerances of the respective contour of these profiles.

Our strength lies in the diversity of our profiles: From simple to complex and highly asymmetrical profiles with cross-sections of up to 150 $mm^2$ (0.23 $in^2$), at Waelzholz we produce profiles which can be used in many demanding applications in a wide range of industries.

**Perfectly adapted to product and production**

Be it for hinges or door lock profiles on furniture pieces, safety-related fastening elements in motor and mechanical engineering or ski and snowboard edges – Waelzholz provides the exact solution for any application and any product in top quality, always perfectly tuned to your product and process requirements.

**01** Examples of profile shapes

**Precise shaping for unparalleled grip: Ski and snowboard edges**

Every year we fine-tune more than 170 different ski and snowboard edges to fit the diverse winter sports products of our customers: From fast carvers to all-mountain skis to high-stress bearing snowboards. The complex shaping of modern skis and snowboards with sidecut, camber and blade shapes sets enormous requirements for our materials. In this context, a lowest possible shape tolerance of the profile is of particular importance to achieve uniform bendability. This is the only way to ensure that our ski and snowboard edges match the shape of the respective sports equipment exactly.

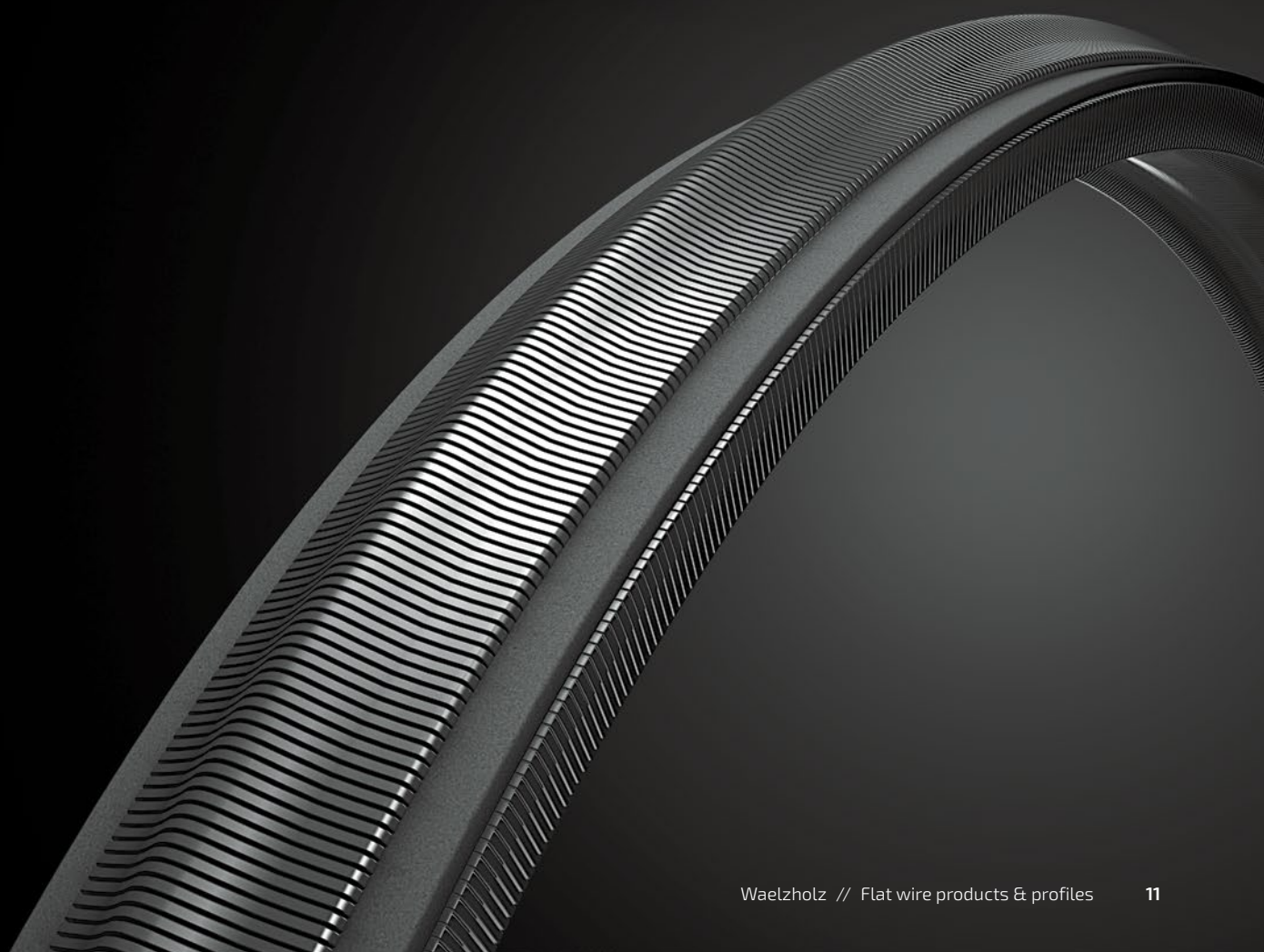
We overcome this challenge with cutting-edge production technology and more than 50 years of experience in this specialized field. And that does not only apply to rolling and hardening and tempering processes but to blanking and bending technology as well. This is how precise, high-stress bearing ski and snowboard edges are created for the most demanding sports applications.

**Precise tapered rolling:**
**Profiles for retaining rings**

A retaining ring must have the same thickness along its entire cross section. However, when the material is bent into the ring shape, the outer edge of the ring is stretched much more than the inner edge. This is why conical profiles are used for this demanding application. Waelzholz achieves unparalleled dimensional accuracy and optimized edge shape of the profile with precise rolling processes and exactly calibrated rolls. Thanks to our in-house profile roll grinding shop, we are able to implement our customers' requirements precisely and flexibly.

**Quality reproduced to a tee:**
**Profiles for push belt chains**

For the production of push chain belts for continuously variable transmissions, the automobile industry relies on Waelzholz profiles. Absolute reliability takes top priority when it comes to this safety-related transmission component. A perfect surface is what matters most here. To provide our customers with long-lasting top quality, we use an eddy current testing procedure for the steel strip surface adapted specifically to our own cold rolled steel strip production line. Measuring an induced magnet field allows us to consistently monitor surface homogeneity while production is underway. This is how we achieve profiles with optimized and reliably reproducible properties, giving you the highest possible degree of reliability to produce high-quality products. As many times as you want.



# Precision starts with the tool

The first step on the way to the perfect profile with the lowest possible dimensional tolerances is far before the rolling process. This happens during the development and processing of the tool – the high-precision profile rolls.

This is why we have perfected roll grinding as a core competence in our company and have our own profile roll grinding shop seamlessly integrated in the production process. Through our own expertise in tool production, we can ensure the precise calibration of the rolls to achieve the perfect shape of the profile contours.

In addition to the lowest possible dimensional tolerances of the rolls, our own roll grinding shop offers an additional advantage for our customers: flexibility. If market and product requirements change, we can respond quickly and adjust the respective tools as needed.

**01** Fastening element made of stainless steel for attaching steel elements to concrete

For further information visit
↗ waelzholz.com/stainless

**Outstanding processing properties and durability**

We also offer our wide range of flat wire products and profiles in stainless steel variations. These materials are ideal for producing products which are exposed to extreme conditions and must therefore be resistant to corrosion, acids or heat in areas such as medical technology, safety-related components in the automobile industry and in electrical engineering.

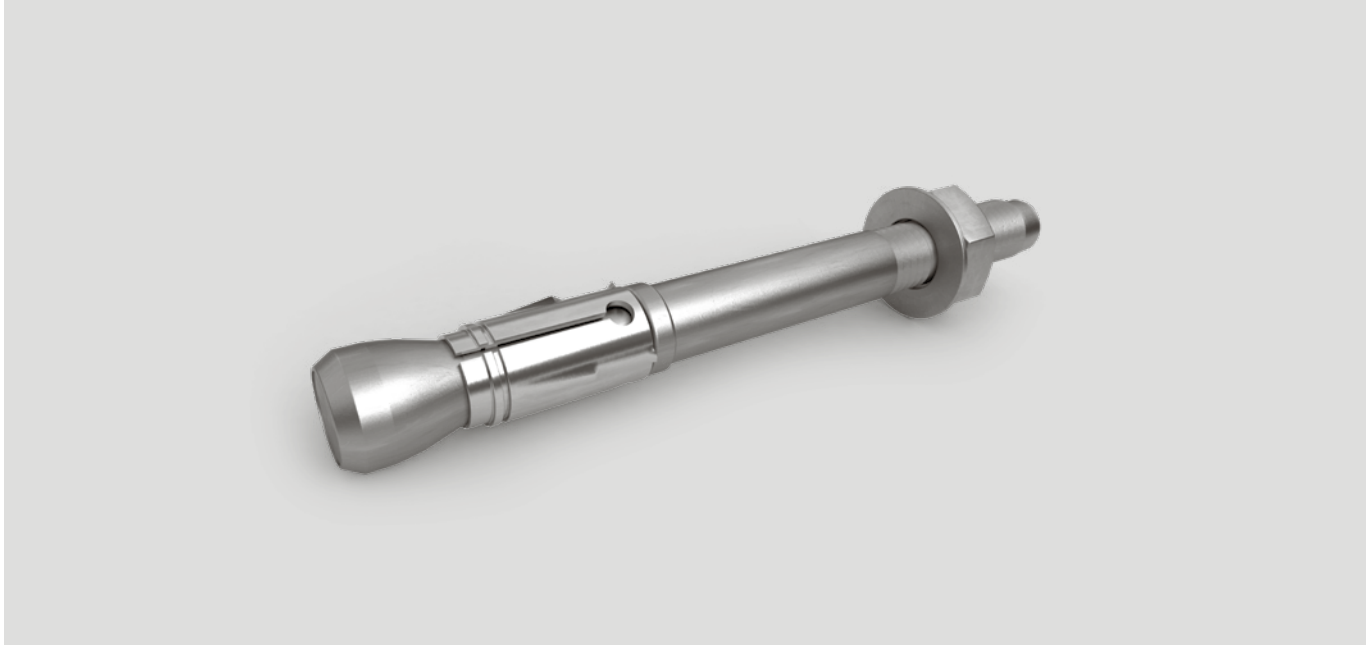
Chrome, nickel, molybdenum and titanium alloys not only improve the corrosion resistance of our materials. Depending on the composition of the alloy and the manufacturing process, additional technological properties such as deep drawability, bendability and punchability as well as improved spring properties can be calibrated individually. What's more, we provide various surface finishes, for example metallic, high-gloss surfaces.

# Stainless: For the toughest applications

**Stainless profiles for resilient fastening elements**

Safety-related fastenings on constructions require particularly high-performance solutions. Special expansion sleeves made of stainless Waelzholz profiles are used for these applications. We use stainless steel with improved corrosion resistance which is ideal for environments with a saline atmosphere or high humidity. The precisely produced Waelzholz profile also offers constant dimensional tolerance within the tightest tolerances.

The material is adjusted in such a way that the front tip of the expansion sleeve, which anchors the element in concrete, possesses high load characteristics. Thanks to these outstanding properties, the fastening element can even be used for applications with extremely high safety requirements, for example for stadiums, roller coasters or applications that must withstand seismic impacts.



# Delivery program flat wire products & profiles

STEEL MATERIALS

From low carbon unalloyed steels to case hardening steels and steels for hardening and tempering to spring steels and high alloyed custom grades according to customer specifications

SURFACES

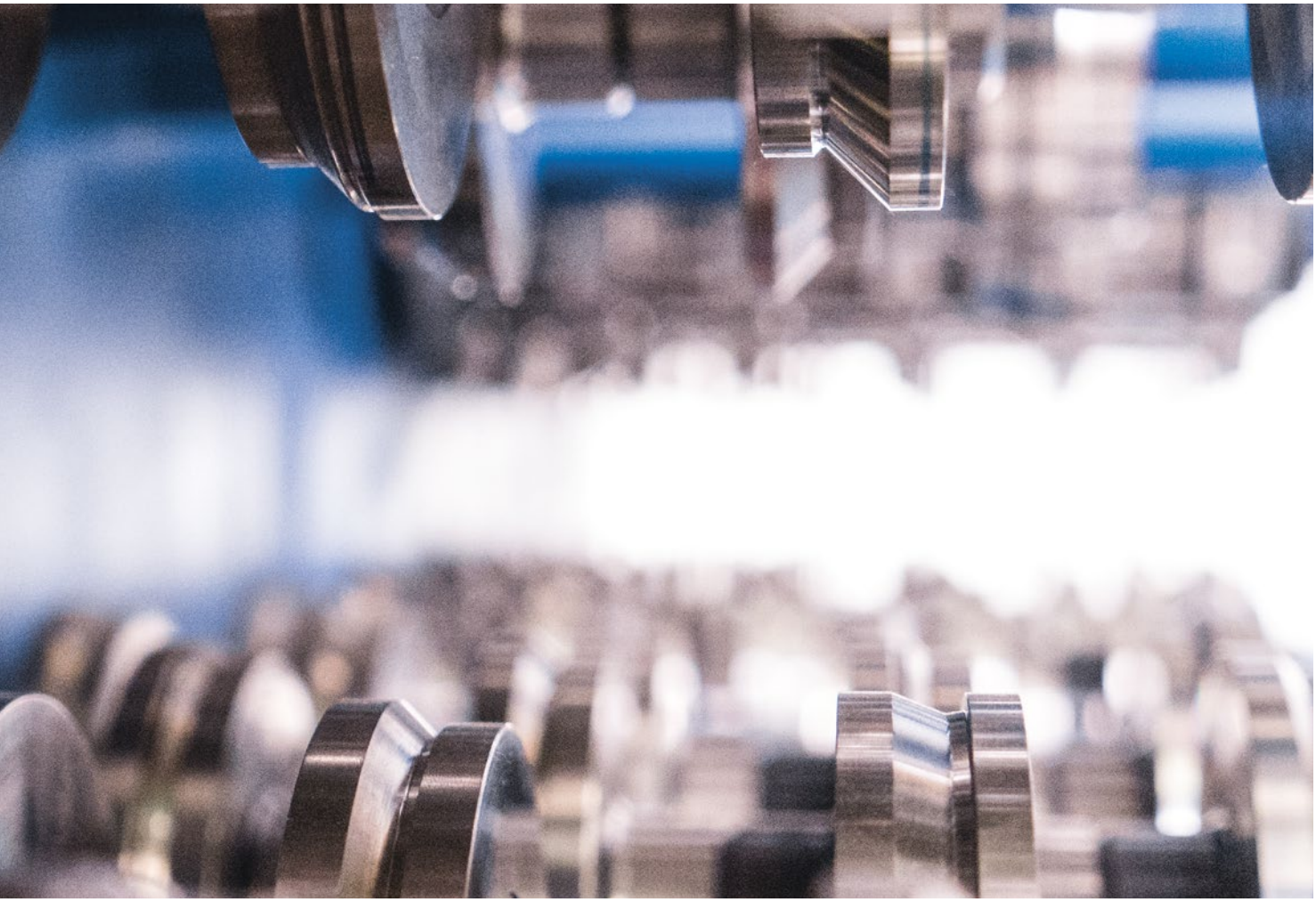
- Bright (RP/MA, MC)
- Grey-blue
- Coated

FINISHES

- Rolled
- Annealed
- Hardened and tempered

EDGES

- NK Mill edge
- SK Custom edge, rolled
- SKS Custom edge, chase-threaded with narrowest radii and angles



DIMENSIONS

**Flat rolled wire products**

| | |
|---|---|
| Thicknesses | 0.15 - 7 mm / 0.006 - 0.28" |
| Widths | 1 - 30 mm / 0.039 - 1.18" |

**Profiles**

| | |
|---|---|
| Cross section | max. 150 $mm^2$ / 0.23 $in^2$ (not tempered) |
| | max. 50 $mm^2$ / 0.078 $in^2$ (tempered) |
| Thicknesses | 0.80 - 5.00 mm / 0.031 - 0.20" |
| Widths | max. 110 mm / 4.33" |

**Custom developments**

Available upon request

DELIVERY TYPES

**Pancake coils**

| | |
|---|---|
| Widths | from 10 mm / 0.39" |
| Inner diameter | 400 - 500 mm / 15.75 - 19.69" |
| Outer diameter | max. 1,350 mm / 53.15" |

**Oscillate-wound coils**

| | |
|---|---|
| Inner diameter | 400 - 500 mm / 15.75 - 19.69" |
| Outer diameter | max. 1,200 mm / 47.24" |
| Coil width | 80 - 550 mm / 3.15 - 21.65" |
| Coil weight | max. 2,700 kg / 5,952 lbs |

**Cut-to-length sheets**

| | |
|---|---|
| Lengths | max. 6,000 mm / 236.22" |

TOLERANCES

Tolerances acc. to DIN EN 10140, custom tolerances upon request

CD

# MORE THAN FLAT WIRE PRODUCTS AND PROFILES

**Discover our wide range of tailor-made steel materials and our worldwide services.**

High-quality flat wire products and profiles from Waelzholz forms the basis of many of our customers' sophisticated products. Our goal has been and continues to be the provision of customized steel materials in this sector. If nothing else, we achieve this through our comprehensive expertise in the development and production of our wide range of materials for highly diverse applications.

As a technology leader for sophisticated steel strip solutions, we rely on uncompromising premium quality. Solution-oriented engineering and services for all phases of the value-added chain make us a reliable partner worldwide.

↗ For further information visit
waelzholz.com/company

# OUR MATERIALS AT A GLANCE

| PRODUCT GROUP | VARIATIONS | CUSTOMER BENEFIT |
|---|---|---|
| Cold rolled steel strip | DC-grade steel , micro-alloyed steel, case-hardening steel, steel for hardening and tempering, spring steel or fine blanking grades: alloyed or as standard grades | Unparalleled dimensional accuracy, good formability, suitable for heat treatment, high elasticity, optimal combination of tensile strength and formability |
| Hardened and tempered steel strip | Martensite, bainite, sorbite | Hardness, homogeneity, spring properties, high resistance to wear, substitution of piece hardening |
| High-strength steel strip | High-strength, micro-alloyed fine grained steel | High resistance to wear and good formability at the same time |
| Surface-coated steel strip | With a phosphate layer refined case-hardening or DC-grade steel | Implementation of complex, multi-stage forming operations, prolonged service life of the forming tool |
| Profiles | Over 250 different profile shapes made of steel strip or wire | Tailored geometries, cross-sections tailored to customer products and processes |
| Electrical steel strip | NO grades, HF grades, HS grades, HP grades, DIN EN 10106, DIN EN 10303, bonding varnish, fast-bonding varnish or insulating varnish | Thermal conductivity, low core losses, high magnetic polarization, hich mechanical durability at high speeds, undisturbed magnetic flux due to elimination of imperfections, improved insulation resistance |
| Flat wire products | Wide range of materials from spring steel to hardened and tempered steel strip | Prolonged service life thanks to a mill edge, high tensile strength and even bending properties |
| Stainless precision steel strip | Corrosion-resistant steel, upon request with special alloys | Resistance to corrosion, acids or heat |

# Customized materials for your industry

Our customers develop future-oriented products in the key industries of today and tomorrow. Here, innovative material solutions are an essential foundation. We know and understand our customers' industries and their requirements – from mobility to energy to multifaceted industrial applications.

We combine this industry expertise with our excellent engineering competence and fine-tuned production processes. Our extensive range of production lines in combination with state-of-the-art and intelligently networked measuring and control technology allows us to produce materials with outstanding properties and to reliably achieve reproducible quality in all areas. This is how we develop and produce one thing in particular for our customers: Unparalleled quality.

↗ For further information visit
waelzholz.com/steel-materials

An international orientation has characterized the successful development of our company since the very start. Today 2,300 employees in Europe, North and South America, and Asia produce more than 780,000 tons of high-quality steel strip and profiles annually.

# First choice when it comes to the future of cold rolled steel strip. Worldwide.

Personal relationships, the digital networking of our production sites and consistently high process standards are what counts when it comes to providing our customers with engineering, production and supply chain management expertise in unparalleled high-quality. Regardless of time and place, anywhere in the world.

This is how we pursue our long-term strategy: continuing consequently our journey as a medium-sized, independent, family-owned company with the development of customized material solutions. So that in the tradition of long-term partnerships we will remain our customers' first choice when it comes to the future of cold rolled steel strip.

**For further information visit**
↗ waelzholz.com/contact-partner

# WELL POSITIONED

| | |
|---|---|
| **Locations worldwide** | 13 locations in Europe, North and South America, and Asia |
| **Employees worldwide** | 2,300 |
| **Sales volume steel materials** | 780,000 tons/year |
| **Share of production outside of Europe** | 33 % |
| **International share of sales** | 65 % |