



# PERFORMANCE IN WIRE

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by voestalpine Wire Technology





# PERFORMANCE IN WIRE

Our world is the world of wire. As a versatile and innovative partner with a unique research infrastructure, we can guarantee you high-quality solutions in your market environment. Based on our core values of quality, flexibility, innovation and sustainability, we live out "Performance in Wire" at every stage of the process.



## QUALITY

We guarantee maximum consistency of mechanical properties, metallurgical structure, geometry and surface quality by bringing the entire value-added chain from our steel through rolled wire to drawn wire under one roof. That focus on quality supported by digital tools enables us to achieve maximum cost efficiency for our customers. Certification to ISO 9001, 14001, 18001, 50001 and IATF 16949 demonstrates our commitment to **Performance in Quality**.



## INNOVATION

With our individually tailored wire solutions we can meet your demands and your customers' requirements. As well as digital product simulations, our unique R&D set up means we can offer the option of individual product development with substantially reduced development times, considering material and process development from steel to the drawn wire, our R&D team guarantees optimised product properties for the subsequent processing and use of your products. That complete package guarantees you **Performance in Innovation**.



## FLEXIBILITY

Our added-value chain starts right from own Iron ore, continues through our steelworks, rolling mill and drawing shops, and even extends beyond our customers' factory gates where necessary. That means we can offer maximum flexibility in every stage of the process, customised solutions for surface treatment, packing shipping, including of course, just-in-time delivery in consignment warehouses and for coil sizes up to 3 tonnes. That is what we understand by **Performance in Flexibility**.



## SUSTAINABILITY

We take responsibility for our society and our environment. Our corporate culture stands for the development of long-term partnerships and dependability at many levels. Right from the product development stage, we take account of the carbon footprint and maximum sustainability of our products. In that way we can guarantee **Performance in Sustainability**.



# PERFORMANCE IN QUALITY

Collaboratively and always one step ahead, we find the right solutions for complex and demanding challenges. We offer bespoke product solutions from drawing stock through drawn wire to ultra-fine wire.

We offer the widest product range in the sector from a single source and have a reputation for high-quality subsequent processing and proven quality.



# COMPLETE PRODUCT PORTFOLIO FROM A SINGLE SOURCE

We supply billets, drawing stock, drawn wire, ultra fine wire, profiled section wire, braided wire and cords made from more than 400 steel alloys in the unalloyed, low-alloy and medium-alloy ranges. Our product portfolio not only covers many ISO standard grades but also a large number of individual custom alloys and materials based on other international standards such as ASTM, JIS, etc.

## THE MAIN GRADES IN OUR RANGE OF STEELS

- » Cold heading and cold extrusion steels to EN 10263-2, 3 and 4
- » Modified steels for cold heading high strength bolts up to strength class 16.9 (on request 18.9)
- » Cold extrusion steels optimised for supplementary machining
- » AFP steels to EN 10267 and bainitic steels to SEW 605
- » Roller bearing steels to EN ISO 683-17 and optimised qualities for special bearing applications
- » Spring steels to EN 10080 and also optimised spring steel qualities with non standard classification
- » Chain steels for manufacturing forged or butt-welded chains
- » Case hardening steels to EN 10084
- » Quenched and tempered steel to EN 10083 and optimised qualities for improved through-hardening
- » Ferritic/pearlitic and pearlitic steels for pre-stressing steels, tyre cord, profiled section wire for flexible pipes, and ultra-high-strength ultra-fine wires
- » Hard drawing qualities to EN ISO 16120-2 – steels for technical springs and wire cable
- » Basic drawing qualities and mild drawing qualities to EN ISO 16120-2 and 16120-3
- » Structural steel and fine-grained steel to EN 10025-2/-3

## SPECIAL QUALITIES

- » Drawing stock for weld metals
- » Special qualities using special measures in the area of secondary steel making

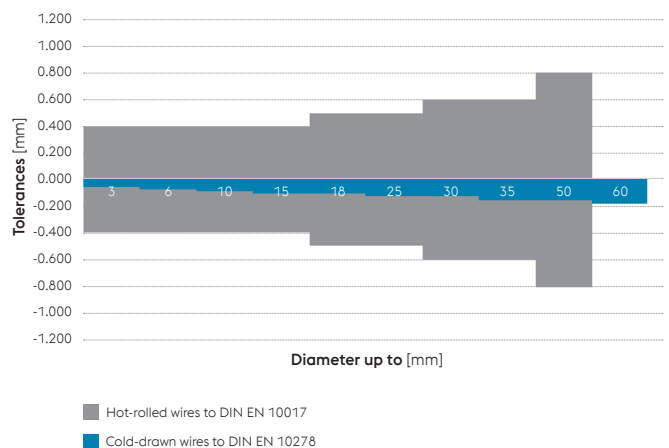
- » Super clean qualities with limited steel inclusions specifically in the surface area
- » High-purity qualities for situations where the route via ESU and VAR is economically unattractive

## DIAMETER RANGES

- » Round bloom 230, rectangular 270 x 360 or 330 x 440 mm
- » Billet 150 x 150 mm
- » Drawing stock 5.0 to 52 mm
- » Cold-drawn wire 0.5 to 49 mm
- » Wet-drawn wire 0.04 to 0.50 mm
- » Surface textured wire 0.09 to 0.175 mm
- » Profiled section wire from 2 to 200 mm<sup>2</sup>
- » Braided wire with filament diameters up to 8 mm
- » Cords with single filament diameters up to 0.5 mm

## TOLERANCES

- » Hot-rolled wires to DIN EN 10017
- » Drawn wires to DIN EN 10278





## BESPOKE SUBSEQUENT PROCESSING

The chemical composition of our steels does not define all of a product's properties. In many cases, the products require extensive subsequent processing stages to optimise their characteristics either for use or processing. In that connection we are guided by your wishes and requirements.

## HEAT TREATMENT

In the rolling process we utilise the following methods:

- » Stelmor cooling  
(fast cooling, standard cooling, active slow cooling)
- » Thermomechanical rolling
- » Bainitic transformations from the rolling heat
- » Water cooling on the Garrett line

In the drawing shops we have a large number of other processes available according to diameter, which are performed open to air or under inert gases:

- » Annealing to spheroidal cementite (+AC)
- » Tempering
- » Soft annealing
- » Annealing to specified strength/hardness
- » Lead-bath patenting
- » Homogenising (>1100 °C) for segregation conditioning
- » Homogenising (>550 °C) for surface transformation
- » Stress relieving

## SURFACE TREATMENT

We are constantly developing new solutions for surface treatments. Our ambition is to produce carbon-neutral coatings for all application scenarios. To that end we maintain close development partnerships with private and public-sector research establishments.

For drawing stock we offer the following options for best-possible surface qualities:

- » Hard-rolled for mechanical or chemical de-scaling
- » Pickled
- » Phosphatised
- » Phosphate-free
- » Limed, soaped, polymer-coated

To ensure the quality of the drawing stock surface, we maintain a fully automated high-rise racking warehouse. In that way we can reduce the risk of mechanical damage, corrosion spots, securing and simplifying transport logistics.

The range of drawn wires is diverse and follows the requirements of subsequent wire use:

- » Pickled
- » Phosphatised
- » Phosphate-free
- » Limed, soaped, polymer-coated
- » Copper, brass, nickel and zinc-based galvanic and chemical coatings
- » Hot-dip galvanising

## PACKAGING

- » Format: 1 kg - 3000 kg
- » Packing: all types, including special solutions for extreme environments and custom delivery formats

## CERTIFICATIONS

- » ISO 9001 (Quality Management)
- » ISO 14001 (Environmental Management)
- » OHSAS 18001 (Occupational Health & Safety)
- » ISO/IEC 17025 (Testing Laboratories)
- » ISO 45001 (Health & Safety Management)
- » ISO 50001 (Energy Management)
- » EMAS III (EU Environmental Audit) audited
- » For our customers in the automotive sector, we are certified to IATF 16949 (automotive industry quality management systems)

In addition, we hold many other specific individual certificates (for particular products or countries), e.g. GL, DNV, etc.



## PLANNED QUALITY

Our quality is planned rather than tested. It involves a far-reaching process because, taking the product features as the starting point, we analyse the essential production parameters at every stage of manufacture for their suitability for achieving the desired quality level.

The outcome is a set of process instructions that are constantly on trial by process engineering and research. Statistical process monitoring provides us with the necessary feedback to enable intervention by staff in case of process deviations and also to identify the potential for continuous improvement.



A stable process is not always sufficient for the documentation of product quality. In some cases we need analytical methods to demonstrate the quality standard achieved to our customers and ourselves. The testing equipment we have in place provides us with a broad span of possibilities for the purpose:

## SURFACE TESTING

In this particular area we rely on the use of optical testing methods and artificial intelligence. It starts right from the rolling of the billets, continues with the precise measurement of the billet geometry in the hot-rolling mill, the documentation of the surface condition and the optical testing along the production line. At critical points, the system is supported by thermography or eddy current testing.

Methods employed along the value-added chain include:

- » Thermography
- » Eddy-current testing
- » Optical testing assisted by AI
- » Acoustic testing assisted by AI

## INTERNAL DEFECT TESTING

Internal flaw tests are carried out on billets to verify core density and absence of cracking.

- » In-line ultrasonic testing
- » Ultrasound immersion testing for critical materials
- » Manual testing for final verification

## DIMENSION CHECKING

For dimension checks we rely on laser and optical spectrometry. The testing parameters applied are diameter, ovality, angular offset in the case of rectangular cross-sections, and evenness in the case of surface-textured products.

## LABORATORY TESTS

To be able to offer the highest standards of laboratory testing, we have established centralised, accredited (EN ISO/IEC 17025) laboratories which are available both for production approvals and stress-proof test results in research programmes.

The list of laboratory tests covers a wide range:

- » Optical microscopy examinations (available at all our sites)
- » Tensile tests (available at all our sites)
- » Scanning electron microscope examinations for micro-structure assessments, phase analyses, element analyses, lattice orientation, slag charts and much more
- » Dilatometer examinations as the basis for optimised heat treatments
- » Physical testing on a thermal-mechanical testing device (temperature, tension/compression, torsion)
- » And much more

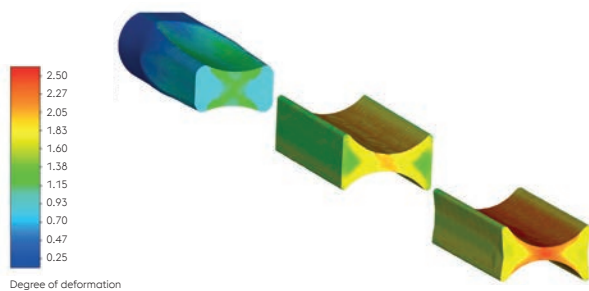
The operational optimum is constantly sought by round robin testing for all testing equipment. Comparative testing with the nearby universities provides a juxtapose with other state-of-the-art technologies.



# PERFORMANCE IN INNOVATION

To meet present and future market demands, we have a well trained and highly motivated team of developers, researchers and product managers at the disposal of our customers, who understand the requirements you place on our products and can infer the relevant product features ensuring an optimised process chain that is supported by the very latest analysis, simulation and process technology. In that way we can ensure that your demands are implemented.

## VIRTUAL PRODUCT DEVELOPMENT

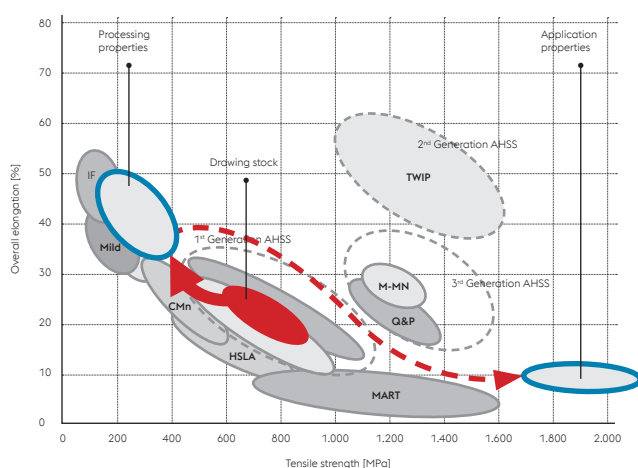


We think holistically. In many cases, a new alloy concept is created virtually on a computer. Cooperative partnerships with universities and research establishments ensure access to current knowledge and the scope to design products from the atomic level upwards right through to forming processes and application properties.

## STEEL DEVELOPMENT

In our MetLab (Metallurgy Laboratory) and TechMet (Technical Centre for Metallurgy) facilities we can offer our customers two globally unique research facilities which can verify and innovate new alloys on a smallest possible scale. Individual compositions can be produced in a very short time. MetLab can provide lab samples for pilot testing from 8 kg up to 50 kg. On that basis TechMet can cast individual 5-tonne billets for verifying the processing capability in the hot-rolling mill and providing initial customer samples.

## WIRE DEVELOPMENT



The development processes for our high-quality wire include the tuning of material and surface properties. We also continually improve not only wire forming in our rolling mill and

drawing shops but also at our customers, who subsequently process the wire into complex products. Another focal point of our development work is finding the right balance between processing and application properties according to customer requirements.

## WIRE TECHNOLOGY CENTRE

Robots and high-speed cameras dominate the Wire Technology Centre. Material, surface and forming create the framework within which the product is further researched and developed. A coating robot which can automatically apply a laboratory designed coating or carry out pickling or cleaning tests, is responsible for surface optimisation, for example: While forming on a fully instrumented drawing machine various measuring systems such as eddy-current testers, high-speed cameras and vibration-measuring equipment are used. That means that in-line testing can be set up from the start without the need to intervene in ongoing production.

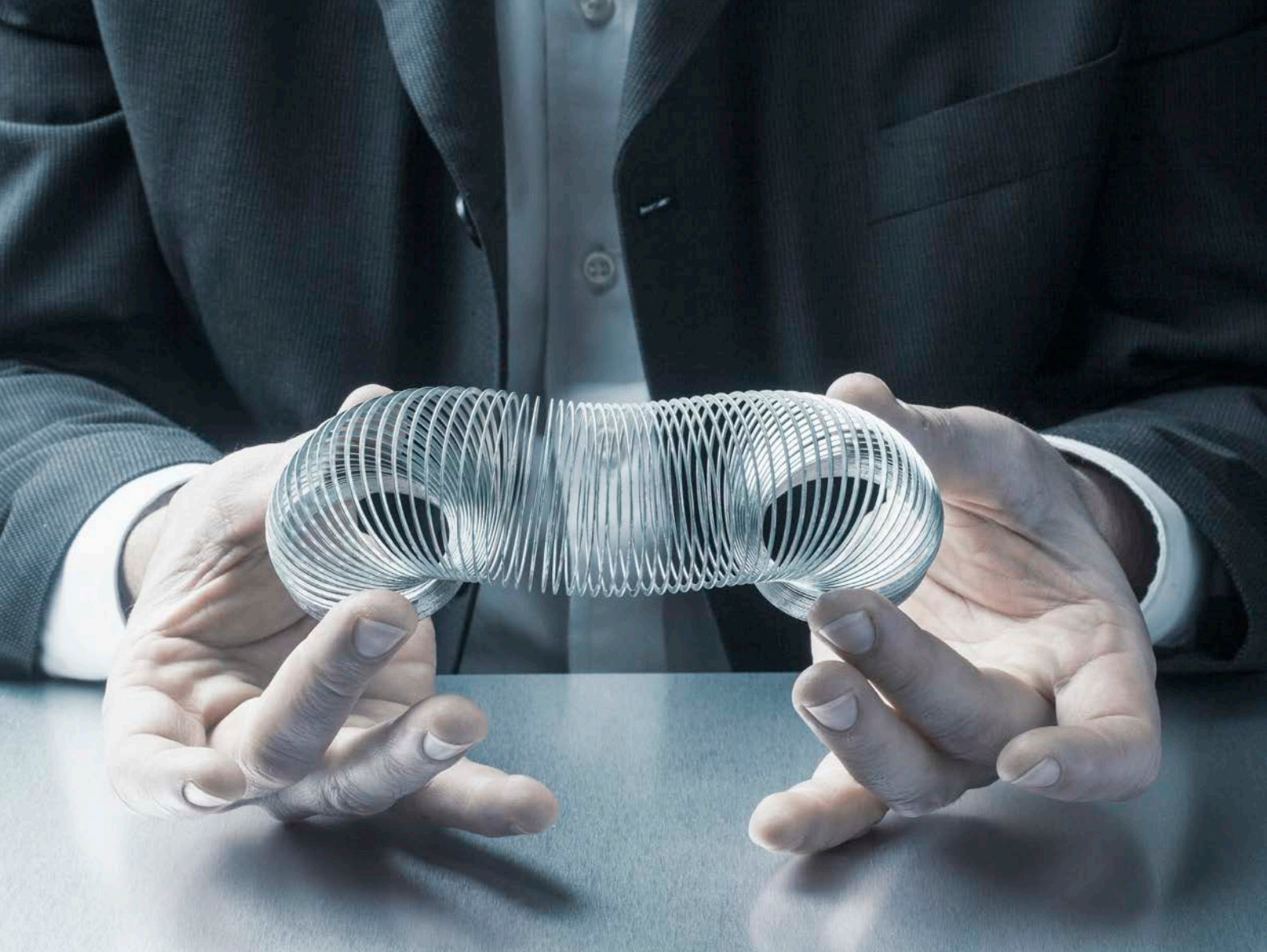
## APPLICATION ENGINEERING AND BASIC PRINCIPLES

Our research and application engineering team has an in-depth understanding of material properties and the physical and chemical requirements of your products. Support in mastering the challenge is provided by our in-house testing facilities and extensive research network.

## YOUR BENEFITS

- » Product portfolio expansion
- » Collaborative material development
- » Custom-made alloy concepts
- » Shorter time to market for newly developed products
- » Laboratory casting formats comparable to large-scale technical plants
- » Easy transfer to serial production
- » Supply of samples in the form of utility models





# PERFORMANCE IN FLEXIBILITY

The world around us is constantly changing and so are we. We are curious and make the achievable possible. For us, flexibility means the potential to overcome challenges. We invest in that potential to be able to offer you innovative solutions in all areas of business operation.

## FLEXIBLE BUSINESS



As a customer, you buy from us because we offer the appropriate added value. The fact that we do so in technical terms is demonstrated in every delivery we make. In addition, depending on requirements, you have access to a dedicated key account contact, a specialist sales advisor, an application engineer or, for especially challenging technical problems, an expert from the Research & Development Department. In that way we guarantee competent collaboration.

## FLEXIBLE PRODUCTION



The perfect balance between flexibility and productivity taking account of costs is the key to success in our production processes. Our entire value-added chain is designed to offer a customised solution. That could be one of eleven routes through the hot-rolling line, a huge diversity of heat treatment and surface coating systems, options for round and profiled-section drawing, innumerable fabrication alternatives and a vast array of transport options right through to the many small solutions to challenges customers present us with.

## FLEXIBLE LOGISTICS



We are equipped to handle the mega-trends that will characterise our future relationship with customers. Our Logistics department works with and on EDI solutions, integrates blockchain technology in our interaction with customers, negotiates VMI (customer/vendor managed inventory) models and much more. Electronic certificates allow customers to rapidly adapt their production to our next delivery.

## FLEXIBLE TEAMS



The willingness to embrace change and flexibility is an essential key capability within our company. Specifically in an environment characterised by digitisation, the 4th industrial revolution and VR technology, we need flexible people. Continual advanced training and targeted development of our team promotes flexibility in action and thinking.





# PERFORMANCE IN SUSTAINABILITY

With sustainability in mind, voestalpine pays special attention to ecological requirements such as long service life, conservation of resources and best-possible re-usability and recyclability when developing new products and processes. In keeping with our forward-looking life cycle assessment concept, the entire value added chain is taken into account at voestalpine.

The aim is to minimise the effects on people and the environment and the carbon footprint, particularly considering that steel, as one of the most environmentally friendly materials, which is 100% recyclable, demonstrates that on a daily basis.



# OUR AIM: A CO<sub>2</sub> NEUTRAL ECONOMY

The voestalpine scenario for achieving our climate targets envisages step-by-step decarbonisation through the long-term vision of hydrogen utilisation. The three main pillars of the concept are:

## DIRECT REDUCTION AS TRANSITIONAL TECHNOLOGY

At our direct reduction plant in Texas, USA, which started operation in the autumn of 2016, HBI (hot briquetted iron)/DRI (direct reduced iron) is produced using natural gas instead of coal/coke. The use of HBI in the existing blast furnaces in Linz and Donauwitz will enable group-wide CO<sub>2</sub> reduction by as much as 5%. Following that, natural gas can be gradually replaced as the reducing agent in the long term by "green hydrogen".

## RENEWABLE ENERGY GENERATION – "GREEN HYDROGEN"

As part of the EU flagship project H2FUTURE, a trial plant for testing out PEM (proton exchange membrane) electrolysis technology together with collaboration partners has started operation at the Linz site. It is currently the world's largest electrolysis plant for green hydrogen generation.

## HYDROGEN – THE TECHNOLOGY OF THE FUTURE

In the SuSteel (sustainable steel-making) trial plant at the Donauwitz site, research into smelting reduction of iron ore using hydrogen plasma instead of the present blast furnace/LD steelworks process is being carried out. The direct production of steel from iron oxides without intermediate stages is the most visionary concept of the research. The aim is the development of a new type of hydrogen plasma technology for CO<sub>2</sub>-free and, therefore, more sustainable production of steel. The intention is to use hydrogen plasma both for reducing the oxides and as the energy source for smelting.

## COMPLIANCE

Compliance is the expression of a philosophy. The core aspect of compliance is not just acting in accordance with legal principles, it goes much further. The focus of compliance activities is primarily to protect free competition and prevent corruption. The group directives adopted for the purpose thus set down the rules for dealing with business agents and consultants, the acceptance and offering of gifts and sponsorship. voestalpine has set down very clear and demanding standards in that regard. In that way, the company signals to customers, suppliers and shareholders that employees of the voestalpine Group are reliable, fair and open partners.

## SOCIAL RESPONSIBILITY

Responsibility towards society – our own corporate social responsibility – is something that voestalpine actively practises by supporting social, cultural and educational initiatives in a wide variety of ways. When selecting the projects to support, careful attention is given to ensuring that they match the company's principles and create a sustainable benefit for society.





# WIRE SOLUTIONS FOR DEMANDING INDUSTRIES

We guarantee bespoke wire solutions through our unique research infrastructure for a dynamic market environment.



## TRANSPORT

- » Car industry
- » Commercial vehicles
- » Railways



## ENERGY

- » Conventional energy
- » Renewable energy



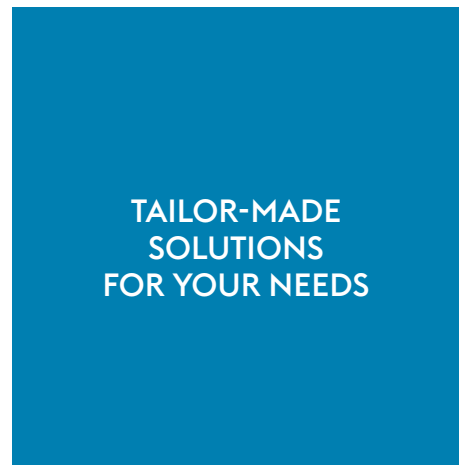
## BUILDING & CONSTRUCTION INDUSTRY



## MECHANICAL ENGINEERING



## FOOD INDUSTRY



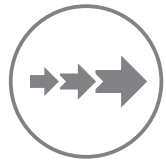
TAILOR-MADE  
SOLUTIONS  
FOR YOUR NEEDS





# WHY voestalpine WIRE?

We offer stable product quality across a broad spectrum of products, experienced product developers, maximum flexibility in fabrication, logistics solutions and packing requirements. With our bespoke solutions we can guarantee:



Consistent quality throughout our entire value added chain



Shortest possible product development times achieved by advanced R&D equipment and the use of digital development tools



Bespoke surface and heat treatment



Highest flexibility in delivery units



Tailor-made packing and transport solutions, protected storage



Sustainable products

## OUR SITES

We supply a world wide customer network from our production sites located chiefly in Europe.

### **voestalpine Wire Rod Austria GmbH**

8792 St. Peter-Freienstein, Drahtstrasse 1, Austria

T: +43 50304 27 0

Range supplied: drawing stock

### **voestalpine Wire Italy srl**

31040 Nervesa della Battaglia, Via Foscari 44, Italy

T: +39 0422 7244

Range supplied: drawn wire (cold heading wire, machine steel wire, mild steel wire, profiled-section wire, coated wire)

### **voestalpine Wire Austria GmbH**

8600 Bruck an der Mur, Bahnhofstrasse 2, Austria

T: +43 50304 22 0

Range supplied: drawn wire (cold heading wire), high tensile steel wire, profiled-section wire

### **voestalpine Wire Suzhou Co. Ltd**

215126 Suzhou, Jiangsu, 121 Xingpu Road, Suzhou

Industrial Park, China

Range supplied: complete product range

### **voestalpine Wire Germany GmbH**

03238 Finsterwalde, Grenzstrasse 45, Germany

T: +49 3531 786 223

Range supplied: drawn wire (cold heading wire, mild steel wire, machine steel wire)

### **voestalpine Special Wire GmbH**

8280 Fürstenfeld, Jahnstrasse 13, Austria

T: +43 50304 15 74742

Range supplied: ultra high-strength ultra-fine wire and technical cords

