

New since 1701 Zapp Precision Metals GmbH





The illustrations, drawings, dimensional and weight data and other information included in this brochure are intended only for the purposes of describing our products and represent non-binding average values. They do not constitute quality data, nor can they be used as the basis for any guarantee of quality or durability. The applications presented serve only as illustrations and can be construed neither as quality data nor as a guarantee in relation to the suitability of the material. This cannot substitute for comprehensive consultation on the selection of our products and on their use in a specific application. The brochure is not subject to change control.

MEDICAL ALLOYS

**02**03

### CONTENT

| 04 | <b>Zapp:</b><br>From past generations –<br>for future generations | <mark>24</mark> | Precision Strip:<br>Medical strip and foil products |
|----|---|-----------------|---|
| 08 | How your production benefits from<br>our semi-finished products   | 26              | Sustainability and ESG Reporting in the Zapp Group  |
| 09 | Delivery forms  | 30              | <b>Medical Alloys:</b><br>Product portfolio         |
| 12 | Bar:<br>A class better  | 32              | Specialized implant grades                          |
| 13 | Wire:<br>High strengths and outstanding ductility                 | 36              | Instrument grades                                   |
| 16 | Fine and ultra-fine wires:<br>New in our portfolio                | 38              | Special grades for medical and dental applications  |
| 18 | Flat wire:<br>Our specialty for decades                           | 40              | Zapp's certificates and approvals                   |
| 19 | Profile:<br>Complex shapes all grades                             | 44              | Contact   |
| 22 | Spring wire for medical devices                                   |                 |   |

### ZAPP: FROM PAST GENERATIONS – FOR FUTURE GENERATIONS

With over **300 years** of tradition and a global presence, Zapp is your fast and reliable partner. With our **experience** and **knowledge**, we ensure that you can turn your ideas into reality. From past generations – to future generations! We are your partner for your projects and take care of the **initial production steps**, such as **cutting to length** and **straightening**. This allows you to focus entirely on the core processes of your production.

Wire, bar, profile, strip, and CAD-CAM discs made from stainless steel, titanium, nickel, and CoCr-based alloys, all custom-manufactured to meet your specific application needs.

Our commitment to innovation, rigorous **quality assurance**, and dedication to solving complex technical challenges drives everything we do.

A movement dedicated to building a future with you, for the benefit of the next generation.

**04**05 MEDICAL ALLOYS

### WE ARE MAKING THINGS HAPPEN FOR YOU

As complex as your application, that's how varied and variable our production possibilities are. You define the product features, and we provide them with a variety of processing and finishing options tailored to your specific needs.

No matter whether wire, bar, profile or flat wire – we deliver the material and the necessary knowledge. With you we develop new ideas and techniques.

#### Our standard

precise, punctual, perfect.

#### Our vision

Only those who move stay at the top. Whether automotive, electronics, or medical technology. Together, we will make sure that our lives and those of the next generations will be easier, better, and safer. **Process-reliable material** – high reproducibility Only those who supply consistent product quality create the basis for a smooth production. At Zapp, we specialize in cold processing to ensure our materials meet the highest standards of reliability and reproducibility.

#### Our strengths

Broad range in milling, rolling, annealing, and grinding

To consistently offer you the best materials, we source globally from premium manufacturers and finish each product to your exact specifications. Our diverse manufacturing capabilities provide flexibility, allowing us to deliver the ideal material for your application.

State-of-the-art machines ensure optimal surfaces and maintain the closest dimensional tolerances. With offices in Europe, North America, and Asia, we are always nearby to serve you.





### »Shaping the future together.«

»The ever-evolving complexity of global supply chains in medical technology presents new challenges every day.

In this dynamic landscape, we continuously discover innovative solutions, work closely with you to enhance successful research and development, procurement and manufacturing.

Each of our diverse products comes with a commitment to trusted collaboration and exceptional service. Together, we navigate the complexities, ensuring your success at every stage.«

Veit Schlaus and Moritz Krämer, from left Account Manager Schwerte location, Germany

### HOW YOUR PRODUCTION BENEFITS FROM OUR SEMI-FINISHED PRODUCTS



### DELIVERY FORMS

#### Wire

- \_In coils
- \_On metal carriers
- \_In barrels
- \_On spools

#### Bar

- \_ In commercial lengths
- \_ In special lengths

#### Profile

- \_ In coils
- \_In bars
- $\_$  On spools

#### Premium wire \_ In barrels

 $_{\rm On\ spools}$ 

Precision strip \_ In coils

\_ On spools \_ In straightened bars

#### \_ In sheets

Blanks

\_ In defined geometries

- \_ In circular blanks
- \_ Tailor made

#### Plates

- \_ In commercial length
- \_ Tailor made
- \_Waterjet-cut

Zapp Med CoCrW CAD-CA

Our CAD/CAM blanks can be used for crowns, bridges and customized constructions.

Zapp Med CoCrW CAD-C



MEDICAL ALLOYS

### »With passion for the customer.«

Even after more than 25 years, I remain passionate about distributing our products due to the wide range of applications they offer. Our highly specialized product range serves customers worldwide across various industries. As an account manager, I am particularly dedicated to supporting my customers in the medical technology field. This commitment drives me to travel to distant countries like India and the U.S.A. For me, the customer is always king.«

Claudia Weigand Account Manager, Medical Alloys Schwerte location, Germany

### **BAR:** A CLASS BETTER

Thickness tolerances

ISO 286-2 (ISO h11-h5)

Drawn, straightened Drawn, straightened, polished Drawn, ground, polished

Ground, polished

Drawn, straightened, ground, polished Drawn, annealed, straightened Drawn, annealed, ground

Drawn, annealed, ground, polished

Specially straightened on request

Drawn, annealed, straightened, ground, polished Surface roughness Ø 1.0-40 mm (Ø 0.04-1.57")

Finishes

Our bar steels consistently exceed standard tolerance classes, thanks to our **superior grinding techniques** that deliver an exceptional surface finish. For quality assurance, we employ **advanced crack detection methods**. We achieve precise and **consistent properties**.

Closer or different tolerances according to customer requirements

Additionally, we manufacture ultra-thin bars with exceptionally **high straightness**, available with **chamfered ends**, and offer a wide range of material options to meet your specific needs.

#### Size range

Ø 0.15 - 100 mm (0.006 - 3.94") round

#### Quality standards

| Annealed and/or cold formed in accordance with EN 10088-3   |
|---|
| Closer and higher mechanical, technological or physical properties according to customer requirements                   |
| Crack tested in accordance to EN 10277-1 Table 1, class 1-4   |
| Tempered  |
| Demagnetized  |
| Defined soft magnetic properties  |
| Ultrasonic tested Ø 6–25 mm (0.24–0.98"), flat bottom hole at least 0.7 mm (0.028") or better, full cross section check |
| Bar length (DIN 10278, manufacturing, stock, exact lengths)   |
| Ø 0.7–1.8 m (0.28–0.07") in lengths of 250–3,000 mm (9.84–118.1")   |
| Ø 1.5 – 5 mm (0.06 – 0.2") in lengths of 250 – 3,800 mm (9.84 – 149.6")   |
| Ø 5–100 mm (0.2–3.93") in lengths of 2,000–6,000 mm<br>(78.74–236.2")   |
| Short lengths   |
| Ø 0.2-3 m (0.008 – 0.12") in lengths of 5–3,000 mm (0.20 –118.1")   |
| End machining   |
| On one or both sides  |
| Chamfered 90° (45°)   |
| Pointed 60° (30°)   |
| Face chamfered  |
| Standards   |
| Draduation appording to national and international standards  |

Production according to national and international standards DIN/ISO/ASTM (e.g., EN 10088-3\*/ISO 5832-1/ASTM A838)

\* The requirements of this standard for the surface of ground steel bars must be agreed in each individual case.

\*\* Other dimensions on request





### WIRE: HIGH STRENGTHS AND OUTSTANDING DUCTILITY

Our wire products feature exceptionally high strengths and – at the same time – outstanding ductility, to a large extent, **free from internal stress.** Depending on the application and intended type of processing, **special finishes** and **coatings** can be supplied.

| Thickness tolerances  |
|---|
| ISO 286-2 (ISO h11-h6)  |
| Closer or different tolerances according to customer requirements |
| Finishes  |
| Finally annealed  |
| Drawn   |
| Bright drawn  |
| Diamond drawn   |
| Degreased   |
| Coated  |
| Zapp-Coat   |
| Nickel (Ni) coated wire   |
| Cu-Sn coated bright drawn wire                                    |
| Specially coated  |
| Standards of ASTM A555, ASTM A580                                 |
|   |

We can also make wires to **specified fixed lengths** entirely free of welds.

What are your requirements for a wire? Challenge us!

#### Size range

Ø 0.15 – 20 mm (0.006–0.8")

| Quality standards  |         |
|--|---------|
| Annealed, cold-hardened in accordance with EN 10088-3, ISO                 | 5832-1  |
| Spring hard to EN 10270-3  |         |
| Eddy current testing   |         |
| Closer mechanical, technological or physical values for your s application | pecific |
| Forms of delivery  |         |
| Coils up to 950 kg (2,095 lbs)   |         |
| Top hat  |         |
| Wire on spools (several types of spools)                                   |         |
| Wire in barrels (wide range of drums)                                      |         |
| Catalog for forms of delivery on request                                   |         |
| Standards  |         |
| Primarily used standards:  |         |
| EN 10088-1+3/EN 10270-3/DIN 17850  |         |
| ASTM B863/ASTM A580/ASTM A555/ASTM A313                                    |         |
| ASTM A493/SEW 470/ISO 5832-1/ASTM F138                                     |         |





## »I grind your bars perfectly and precisely.«

»I have dedicated my entire career to Zapp, starting with a student internship in grade 9. After a summer job, I began my training as a tool mechanic and have now been with Zapp for 24 years.

The introduction of new techniques ensures my work is never monotonous, as I am continually challenged to meet my own high standards. The bars I grind must always be in optimal condition and consistently maintain the highest quality. This is something our customers should always notice and appreciate.«

Markus Globisch Grinder, Precision Wire Schwerte location, Germany

### FINE AND ULTRA-FINE WIRES: NEW IN OUR PORTFOLIO

We develop the ideal wire for medical product applications. Our fine and ultra-fine wires offer narrow strength windows, minimal diameter tolerances and a highgloss surface. Supplied on spools, pre-straightened or cut to length, but always tailored to the manufacturer's requirements.

Popular medical steels such as 1.4310, 1.4301, 1.4441 and MP35N<sup>®</sup>\* are used in the manufacture of vascular guide wires, catheters, root canal files and needle wires, for example. Customers can rely on Zapp products for their minimally invasive applications.

We offer customized wire solutions for every project. With our expertise and state-of-the-art manufacturing techniques, we fulfill your special requirements reliably and precisely.

#### Size range

Ø 0.01-0.15 mm (0.0004-0.006")

Below you will find the most important information about our medical fine and ultra-fine wires.



| Steel grade   | Stylet<br>wire | Catheter | Guide<br>wires | Spring<br>wires | Surgical needles | Suture wires | Staple | Implants | Root<br>canal files |
|---------------|----------------|----------|----------------|-----------------|------------------|--------------|--------|----------|---------------------|
| 302/1.4310    | 0              | 0        |                | 0               |                  |              |        |          | 0                   |
| 301/1.4310    | 0              | 0        | 0              | 0               | 0                |              |        |          | 0                   |
| 304V/1.4310   | 0              | 0        | 0              | 0               |                  |              |        |          | 0                   |
| 304/1.4310    | 0              | 0        |                |                 |                  |              |        |          |                     |
| 304L/1.4306   | 0              | 0        |                |                 |                  |              |        |          |                     |
| 316/1.4401    | 0              | 0        |                | 0               |                  |              |        |          |                     |
| 316L/1.4404   | 0              | 0        |                |                 |                  |              |        |          |                     |
| 316LVM/1.4441 | 0              | 0        | 0              |                 |                  | 0            | 0      | 0        |                     |
| CoCr          | 0              | 0        | 0              | 0               | 0                |              |        | 0        |                     |



### FLAT WIRE: OUR SPECIALTY FOR DECADES

Our flat wire products permit the **finest dimensional and stability tolerances** to be achieved with regard to specified annular curvatures and straightness. They can also be supplied in the form of a single core without welds, thereby **optimizing subsequent processing.** Depending on requirements, we supply plain or coated surfaces, also hardened.

#### Size range

Width 0.5 – 17 mm (0.02 – 0.59") Thickness 0.1 – 4 mm (0.004 – 0.16") Individual tolerances

#### Flat wire edge treatment



Flat rolled: rounded narrow sides Flat rolled: round narrow sides

Flat rolled: rounded edges

Product range with flat rolled cross-sections

#### Tensile strength limits



Width (inches)



### **PROFILE:** COMPLEX SHAPES ALL GRADES

Our »near net shape« profiles ensure the minimum of expenditure on machining. Over 5,000 differently shaped **profiles** speed up the process of finding ideas – ranging from a small triangular profile with a length per side of 0.3 mm (0.01") to a 63 x 6.35 mm (2.48 x 0.25") flat profile, both **made to customers'** drawings.

With a broad spectrum of shaping technologies at our disposal such as drawing and rolling, we can **cold-form** even exceptionally **complex** profile shapes. For measuring purposes, we use mechanical or opto-electronic scanning.

We deliver our products in rings, on coils, or in bars up to a length of 9,000 mm (354") according to customer specifications. Our tool-room is equipped with the latest CNC processing machines and holds **12,000 tools** in store. This saves time and promotes the punctual delivery of shipments.

#### Choice of profile geometries



#### Size range

Width 0.4 - 63.50 mm (0.016 - 2.5") Thickness 0.25 - 34 mm (0.01 - 1.34")

| Forms of profiles  |
|--|
| Square, hexagon, octagon, key bar  |
| Special profiles according to customer specification   |
| Finishes   |
| Drawn to profile, specially rolled, rolled to profile  |
| Cross and longitudinal shaping   |
| Profiles made of faultlessly ground rolled rods  |
| Finishes depend on material, shape and tensile strength  |
| Surface finishes   |
| Dull, bright, very bright, bonderized  |
| Lowest roughness values  |
| Tolerances   |
| EN 10278   |
| Tightest tolerances depending on geometry on request   |
| Straightness   |
| Minimal deviation depending on product form by agreement   |
| Edge finishes  |
| Special edge finishes for profile bars   |
| Quality standards  |
| Annealed, cold-hardened according to EN 10088-3, ISO 5832-1  |
| Closer mechanical, technical or physical properties by agreement   |
| Forms of delivery (EN 10278)   |
| Bars in manufactured lengths, stock lengths, precise lengths can be supplied up to 9,000 mm (354.3") +/- 5 mm (0.2") |
| Spools to EN 60264-2-1   |
| Packet wrapped coils   |
| Special spools of 10-2,000 kg (22-4,400 lbs)   |
| Chamfered or sawn bar ends   |
| Forms of delivery depend on the cross-profile  |
| Standards  |
| Primarily used standards: DIN 17850/SEW 470/EN 10005/  |

Primarily used standards: DIN 17850/SEW 470/EN 10095/ EN 10088-3/ISO 5832-1/ASTM F138

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# »Our customers receive the exact profile they ordered from me.«

» In the profile section, there are 17 tandem mills, and I alternately operate five of them. My responsibilities include everything from setup and adjustment to production and final inspection. Tandem mills are complex machines requiring precise coordination of multiple rolling stands to work in perfect sync.

This demands both routine and extensive experience to ensure each profile is produced with micron-level precision. I have honed this expertise over more than 30 years at Zapp.

My goal is to ensure that every profile leaving our facility meets the highest standards of perfection, ensuring our customers' satisfaction.«

Thomas Kijas Process Mechanic Schwerte location, Germany

### SPRING WIRE FOR MEDICAL DEVICES

#### Spring wire for medical devices

- \_ Blood lancets
- \_ Syringes
- \_ Auto-injectors
- \_ Drug delivery systems
- \_ Inhaler systems
- \_ Dispenser devices
- \_ Diagnostic tools
- \_ General medical applications

#### Finish

Coated: 0.25-10.00 mm (0.0098-0.394") Bright: 0.10-1.10 mm (0.0039-0.043")

#### Non-destructive testing

\_ Eddy Current Testing

#### Norms and Standards

- \_ASTM 302
- \_ SUS 302/304
- \_ EN 10270-3/ISO 6931-1

## Nickel-coated: 0.10-0.90 mm (0.0039-0.035")

#### Medical spring wires made of special alloys

|                          | Chemical composition (Mass-%) |       |       |         |         |      |   |     |     |       |      |  |
|--------------------------|-------------------------------|-------|-------|---------|---------|------|---|-----|-----|-------|------|--|
| Brand name               | С                             | Si    | Mn    | Р       | S       | Cr   | v | Мо  | Ni  | Ν     | Cu   |  |
| 12R10, 1.4310FK          | 0.08                          | 0.5   | 1.2   | ≤ 0.040 | ≤ 0.010 | 18.0 | - | -   | 8.2 | -     | -    |  |
| T302, 1.4310FT           | 0.07                          | 0.5   | 1.3   | ≤ 0.035 | ≤ 0.015 | 18.5 | - | -   | 8.0 | -     | -    |  |
| 11R51, 1.4310FP          | 0.08                          | 1.5   | 1.8   | ≤ 0.025 | ≤ 0.010 | 17.0 | - | 0.7 | 7.5 | _     | _    |  |
| Springflex, 1.4462XB     | 0.03                          | 0.5   | 0.9   | ≤ 0.030 | ≤ 0.015 | 22.0 | - | 3.2 | 5.0 | 0.18  | -    |  |
| 1.4369AA, 13RM19         | 0.11                          | 0.8   | 6.0   | ≤ 0.030 | ≤ 0.015 | 18.5 | - | _   | 7.0 | 0.025 | 0.11 |  |
| Nanoflex, 9.9910GA/1RK91 | ≤ 0.02                        | ≤ 0.5 | ≤ 0.5 | ≤ 0.020 | ≤ 0.005 | 12.0 | - | 4.0 | 9.0 | _     | _    |  |
|                          |                               |       |       |         |         |      |   |     |     |       |      |  |

Precision-manufactured medical spring wires made from high-quality materials.

### PRECISION STRIP: MEDICAL STRIP AND FOIL PRODUCTS

#### Stainless steel and titanium alloys

Using a combination of top-tier rolling and finishing processes, we produce Zapp products with the tightest tolerances in terms of dimensions, shape and mechanical properties. Our state-of-the-art manufacturing technologies and precisely calibrated processes ensure exceptional quality. This commitment to precision allows us to meet the stringent specifications of our customers and deliver products that adhere to the highest medical technology standards.

24/7

**GLOBAL PRECISION STRIP** 

2 Plants

4 Service Centers 7 Days/week

#### Specialties

- \_ Ultra-thin foils, down to a thickness of 0.020 mm
- \_ Special heat-treated products (stress-relief annealed, super stress-relief annealed)
- \_ Ultra-high-strength strip (> 2,000 MPa)
- \_ Hardened and tempered martensitic strip
- \_ Premium range of titanium materials
- \_ Special surface finishes

#### Our specialty: Thin and wide Our standard: Precise, flat, reliable

Our precision strips and foils stand out due to their exceptional characteristics, making them ideal for the production of surgical instruments and implants.

As specialists, we are one of the few providers of thin precision strips and foils. Additionally, we offer an extensive range of grades, strengths, dimensions and surface finishes.

Request our technical information or samples today! medicalalloys@zapp.com



#### Dimension for standard products



MEDICAL ALLOYS





27 MEDICAL ALLOYS

### SUSTAINABILITY AND ESG REPORTING IN THE ZAPP GROUP

#### Find this information at Zapp

At Zapp Group, our ESG (Environmental, Social, and Governance) reporting encompasses comprehensive metrics and standards across environmental impact, social responsibility, and governance practices. In compliance with the EU's sustainability reporting standards, we diligently calculate key performance indicators and disclose a broad spectrum of relevant topics. For detailed information on our sustainability initiatives and performance, please visit our website at www.zapp.com.

Additionally, comprehensive details regarding our adherence to the German Supply Chain Sustainability Act (LkSG) are available on the Integrity Next platform through our Zapp company profiles.









### »Sensitive products in medical technology require the highest precision!«

»I am passionate about supporting our customers with these challenges every day, contributing to their satisfaction.«

#### Nathalie Bart

Inside Sales Schwerte location, Germany



### **MEDICAL ALLOYS:** PRODUCT PORTFOLIO

#### Grades

DIN EN/ Trade name

|                                  | _                            |
|----------------------------------|------------------------------|
| Special implant grades           |                              |
| Austenite, AISI 316LVM           | 1.4441                       |
| Austenite, alloy 734             | 1.4472/Rex 734 <sup>™*</sup> |
| Austenite, nickel-free           | 9.9007                       |
| Co-Ni-Cr-Mo-alloy, implant       | 9.9035/MP35N <sup>®</sup> ** |
| Co-Cr-Mo, forging alloy          | 9.9135                       |
| Co-Cr-W-alloy                    | 9.9229                       |
| Co-Cr-W-Ni-alloy                 | 2.4964HL/L605***             |
| Pure titanium grade 1            | 3.7025                       |
| Pure titanium grade 2            | 3.7035                       |
| Pure titanium grade 3            | 3.7055                       |
| Pure titanium grade 4            | 3.7065                       |
| Titanium alloy Ti6AL4V ELI       | 3.7165                       |
| Titanium alloy Ti15Mo            | 9.9150                       |
| Titanium alloy Ti6AlNb7          | 9.9367                       |
| Instrument grades                |                              |
| Ferrite                          | 1.4523                       |
| Martensite 13% Cr, AISI 420A     | 1.4021                       |
| Martensite 13% Cr, AISI 420B     | 1.4028                       |
| Martensite 13% Cr, AISI 420X     | 1.4031                       |
| Martensite 13% Cr, AISI 420C     | 1.4034                       |
| Martensite13% Cr, AISI 420C(+S)  | 1.4035                       |
| Martensite 13% Cr, AISI 420F mod | 1.4197                       |
| Martensite 17% Cr, AISI 430F     | 1.4104                       |
| Martensite 17% Cr, AISI 431      | 1.4057                       |
| Martensite 17% Cr, AISI 440A     | 9.9440YA                     |
| Martensite 17% Cr, AISI 440A mod | 9.9440YL                     |
| Martensite 17% Cr, AISI 420 mod  | 1.4123YN                     |
| Martensite 17% Cr, AISI 440C     | 1.4125                       |
| Martensite                       | 1.4108                       |
| Precipitation hardenable steels  |                              |
| Special alloy 17-4-PH            | 1.4542                       |
| Special alloy 17-7-PH            | 1.4568                       |
| Special alloy XM-16, alloy 455   | 1.4543                       |
| Alloy 465                        | 1.4614                       |
| Stainless steel 1RK91            | 9.9910                       |
| Austenite                        | 1.4310                       |
| Special grades                   |                              |
| Austenite                        | 1.4401/1.4404                |
|                                  |                              |

Other grades available on request.

- \* Rex 734<sup>™</sup> is a product and registered trademark of ATI Allvac
- LLC in the EU and the USA.
- \*\*\*L605 is a product and registered trademark of SPS Technologies, LLC in the EU.

#### Developed and manufactured for you

#### Bars

- \_ 0.15-100 mm (0.006-3.94")
- \_ Drawn, peeled, ground, polished
- \_ Chamfered, centered, pointed
- \_ Annealed, cold worked, stress released
- \_ Straightness 0.5 mm/m (0.02"/m) on demand up to 0.2 mm/m (0.008"/m)
- \_ Special surface roughness up to
- Ra < 0.3 µm \_ ISO 286-2 in tolerances ISO h11
- to ISO h05
- \_ Integrated crack detection
- \_ Ultrasonic testing, camera technology

#### **Fine Wire and Premium Wire**

- 0.10 20 mm (0.004 0.8")
- \_ Bright drawn, diamond drawn, specially coated
- \_ In tolerances ISO h11 to ISO h05
- \_ Crack detected products

#### Profiles

- \_ 0.3 x 0.3 mm 63 x 6.35 mm (0.012 x 0.012"- 2.48 x 0.25")
- \_ Milled, rolled, drawn
- \_ Dull, bright, extreme bright
- \_ Aquare, hexagonal, octagonal
- \_ 1/2, 1/3 and 1/4 tube
- \_ Implant-special shapes
- \_ »Near net shape«
- \_ Precision profile according drawing water-jet-cut blank

#### **Precision Strip**

- \_ Thickness from 0.02 2.50 mm 0.0008-0.10"
- \_ Width from 2-1,066 mm (0.08-41.97")
- \_ Cold worked, final annealed
- \_ Tempered

#### Sheets/plates

- \_ Thickness: 0.5 155 mm (0.02 6.10")
- \_ Width: 914 2,000 mm (35.98 78.74")
- \_ Length: 2,000 6,000 mm (78.74 236.22")
- \_ Square or in circular blanks
- \_ Water-jet-cut
- \_ Cut to length according to customer drawing

#### CAD-CAM discs

### Applications

- \_Abrasor
- \_ Bone nail \_ Bone plate
- \_Bone saw
- \_ Bone screw
- \_ Cad-cam discs
- \_ Cerclage
- \_ Dental burr
- \_ Dental cutter
- \_ Dental implant
- \_ Endoprosthesis
- \_ Fixation system
- \_ Instrument
- \_ Intra-medullary nail \_ Joint replacement
- Laboratory equipment
- \_ Maxillofacial surgery
- \_ Orthodontic brace
- \_ Rotating instrument
- \_ Scalpel
- \_ Scissors
- \_ Shoulder, hip, knee
- \_ Spinal implant
- \_ Stamping and bending part \_Surgical needle
- \_ Vascular surgery

- \*\* MP35N<sup>®</sup> is a product and registered trademark of SPS Technologies,

Our precisely straightened bars are primarily used in implants and instruments.

### SPECIALIZED IMPLANT GRADES

#### What sets us apart

- \_ Product-specific selection of steel materials
- \_ Compliance with national and international standards
- \_Customized material properties
- \_ Optimized characteristics in terms of biocompatibility, fatigue resistance, purity
- \_ Allergy prevention: Substitution of nickel with manganese and nitrogen
- \_ Highest corrosion resistance

#### Special implant material

|  | Chemical Composition (Mass-%)        |              |              |              |               |       |      |                |                |              |              |      |              |     |
|--|--------------------------------------|--------------|--------------|--------------|---------------|-------|------|----------------|----------------|--------------|--------------|------|--------------|-----|
| Brand name                               | Material<br>norms                    |              | С            | Si           | Mn            | Р     | S    | Cr             | Ni             | Мо           | Nb           | Cu   | Ν            | Fe  |
| Ergste <sup>®</sup> 1.4441LA,<br>316 LVM | ASTM F138<br>ASTM F139<br>ISO 5832-1 | min.<br>max. | 0.030        | 0.75         | 2.00          | 0.025 | 0.01 | 17.00<br>19.00 | 13.00<br>15.00 | 2.25<br>3.00 | -            | 0.50 | 0.10         | bal |
| Ergste® 1.4472RN,<br>High N              | ASTM F1586<br>ISO 5832-9             | min.<br>max. | 0.080        | 0.75         | 2.00<br>4.25  | 0.025 | 0.01 | 19.50<br>22.00 | 9.00<br>11.00  | 2.00<br>3.00 | 0.25<br>0.80 | 0.25 | 0.25<br>0.50 | bal |
| Ergste <sup>®</sup> 9.9007CN             | ASTM F2581                           | min.<br>max. | 0.15<br>0.25 | 0.20<br>0.60 | 9.50<br>12.50 | 0.020 | 0.01 | 16.50<br>18.00 | 0.05           | 2.70<br>3.70 | -            | 0.25 | 0.45<br>0.55 | bal |

|                               | Chemical Composition (Mass-%)                     |              |       |      |      |       |       |                |                |               |                |      |      |      |     |
|-------------------------------|---|--------------|-------|------|------|-------|-------|----------------|----------------|---------------|----------------|------|------|------|-----|
| Brand name                    | Material<br>norms                                 |              | С     | Si   | Mn   | Р     | S     | Cr             | Ni             | Мо            | W              | Fe   | Ti   | Ν    | Со  |
| Ergste <sup>®</sup> 9.9035    | ASTM F562<br>ISO 5832-6                           | min.<br>max. | 0.025 | 0.15 | 0.15 | 0.015 | 0.01  | 19.00<br>21.00 | 33.00<br>37.00 | 9.00<br>10.50 | -              | 1.00 | 1.00 | -    | bal |
| Ergiloy <sup>®</sup> 9.9135HL | ASTM F1537<br>(Alloy 1)<br>ISO 5832-12<br>(Low C) | min.<br>max. | 0.14  | 1.00 | 1.00 | -     | -     | 26.00<br>30.00 | 1.00           | 5.00<br>7.00  | -              | 0.75 | -    | 0.25 | bal |
| Ergiloy <sup>®</sup> 2.4964HL | ASTM F90<br>ISO 5832-5                            | min.<br>max. | 0.15  | 0.40 | 2.00 | 0.04  | 0.030 | 19.00<br>21.00 | 9.00<br>11.00  | -             | 14.00<br>16.00 | 3.00 | -    | -    | bal |
|                               |   |              |       |      |      |       |       |                |                |               |                |      |      |      |     |

### IMPLANT GRADES MADE OF TITANIUM

#### Your Advantages

- \_ Pure titanium grades 1, 2, 3, 4
- \_ Titanium alloys:
- TiAl6V4 ELI, TiMo15, TiAl6Nb7
- \_ Complete range of strengths and structural conditions
- \_ From cold-worked to final annealed
- \_ Improved mechanical and technological properties
- \_ Enhanced corrosion protection properties

- \_ Microstructure settings with extra fine grain size
- \_ Tightest tolerances, above-average straightness, best surface finishes
- \_Excellent biocompatibility

#### Implant grades made of titanium

|                               |                           |                    |      |      | Chemi  | cal Com | position   | (Mass-%)   |              |            |     |
|-------------------------------|---------------------------|--------------------|------|------|--------|---------|------------|------------|--------------|------------|-----|
| Brand name                    | Material norms            | С                  | Fe   | 0    | н      | Ν       | AI         | v          | Мо           | Nb         | Ti  |
| Ergitan <sup>®</sup> 3.7025MG | ASTM F67<br>ISO 5832-2    | min.<br>max 0.080  | 0.20 | 0.18 | 0.0125 | 0.03    | -          | -          | _            | -          | bal |
| Ergitan <sup>®</sup> 3.7035MG | ASTM F67<br>ISO 5832-2    | min.<br>max. 0.080 | 0.30 | 0.25 | 0.0125 | 0.03    | -          | -          | _            | -          | bal |
| Ergitan <sup>®</sup> 3.7055MG | ASTM F67<br>ISO 5832-2    | min.<br>max. 0.080 | 0.30 | 0.35 | 0.0125 | 0.05    | -          | -          | _            | -          | bal |
| Ergitan <sup>®</sup> 3.7065MG | ASTM F67<br>ISO 5832-2    | min.<br>max. 0.080 | 0.50 | 0.40 | 0.0125 | 0.05    | -          | -          | _            | -          | bal |
| Ergitan <sup>®</sup> 3.7165MG | ASTM F136<br>ISO 5832-3   | min.<br>max. 0.080 | 0.25 | 0.13 | 0.0120 | 0.05    | 5.5<br>6.5 | 3.5<br>4.5 | _            | -          | bal |
| Ergitan <sup>®</sup> 9.9150MG | ASTM F2066<br>ISO 5832-14 | min.<br>max. 0.100 | 0.10 | 0.20 | 0.0150 | 0.05    | -          | -          | 14.0<br>16.0 | -          | bal |
| Ergitan <sup>®</sup> 9.9367MG | ASTM F1295<br>ISO 5832-11 | min.<br>max. 0.080 | 0.25 | 0.20 | 0.009  | 0.05    | 5.5<br>6.5 | -          | -            | 6.5<br>7.5 | bal |





### »Medical technology stands for quality of life.«

»At Zapp, particularly in the medical technology sector, we are committed to delivering the highest quality wires, bars, profiles, sheets, and strips tailored to your specifications.
We understand that when it comes to receiving an implant, everyone wants the assurance that they have the best possible product in their body. This is a responsibility we take very seriously, as nothing comes closer to us in the truest sense.

To meet this responsibility, we are continually advancing our skills and improving our semi-finished products. Our goal is to provide you with the highest quality materials and to be your leading development partner for the future. The foundation of this partnership is mutual trust, placing you and your product at the center of everything we do.

We are dedicated to long-term partnerships and have a global presence to respond swiftly to your needs. Take advantage of our flexibility.

With our comprehensive portfolio, we cover the entire spectrum of medical technology, offering everything from a single source.

My team and I are here to support you, today and tomorrow.«

Christian Schuchardt Head of Sales Medical Alloys Schwerte location, Germany



### INSTRUMENT GRADES

#### Your advantages

- \_ Maximum variety of hardenable materials for use according to ASTM F899
- \_ Highest corrosion resistance of martensitic grades
- \_Stress-relieved

- \_ Electro-slag remelting (ESR)
- \_Optimal machining capabilities
- \_ Tightest tolerances, above-average straightness, highest surface finishes
- \_Hi-tech specialty grades



#### Our steels

- Martensitic steels
- Austenitic steels
- Precipitation hardenable steels

\* Hardness after specific heat treatment from solution-annealed condition

### MATERIALS FOR INSTRUMENTS - MARTENSITES

#### Materials for instruments

|  |                    |              | Chemical Composition (Mass-%) |              |              |        |              |                |              |              |      |   |  |  |
|--|--------------------|--------------|-------------------------------|--------------|--------------|--------|--------------|----------------|--------------|--------------|------|---|--|--|
| Brand name                               | Туре               |              | С                             | Si           | Mn           | Р      | S            | Cr             | v            | Мо           | Ν    | Typical application   |  |  |
| Ergste <sup>®</sup> 1.4021YB             | AISI 420A          | min.<br>max  | 0.16<br>0.25                  | 1.00         | 1.00         | 0.040  | 0.030        | 12.00<br>14.00 | 1.00         | -            | -    | Instruments   |  |  |
| Ergste <sup>®</sup> 1.4028YN             | AISI 420B          | min.<br>max. | 0.26<br>0.35                  | 1.00         | 1.50         | 0.040  | 0.030        | 12.00<br>14.00 | -            | -            | -    | Bone saws, rotating instruments, cutter                             |  |  |
| Ergste <sup>®</sup> 1.4028MO             | AISI 420B<br>(+Mo) | min.<br>max. | 0.34<br>0.38                  | 1.00         | 1.00         | 0.040  | 0.030        | 13.00<br>14.00 | -            | 0.90<br>1.10 | _    | Instruments, bone saws  |  |  |
| Ergste <sup>®</sup> 1.4031YC             | AISI 420X          | min.<br>max. | 0.36<br>0.42                  | 1.00         | 1.00         | 0.040  | 0.030        | 12.50<br>14.50 | -            | -            | -    | Surgical needles  |  |  |
| Ergste <sup>®</sup> 1.4034YK             | AISI 420C          | min.<br>max. | 0.43<br>0.50                  | 1.00         | 1.00         | 0.040  | 0.030        | 13.00<br>14.50 | 1.00         | -            | -    | Instrument handholds,<br>cutter                                     |  |  |
| Ergste <sup>®</sup> 1.4035YU             | AISI 420C<br>(+S)  | min.<br>max. | 0.43<br>0.50                  | 1.00         | 1.00         | 0.040  | 0.15<br>0.30 | 12.50<br>14.50 | 1.00         | -            | -    | Precision instruments, cutter                                       |  |  |
| Ergste <sup>®</sup> 1.4108               | -                  | min.<br>max  | 0.28<br>0.34                  | 0.30<br>0.80 | 0.30<br>0.60 | 0.020  | 0.010        | 14.50<br>16.00 | -            | 0.95<br>1.10 | 0.30 | Drills, screwdrivers,<br>chisels, saw blades,<br>cutting tools      |  |  |
| Ergste <sup>®</sup> 1.4197YU             | AISI 420F<br>mod   | min.<br>max. | 0.20<br>0.26                  | 1.00         | 2.00         | 0.040  | 0.15<br>0.27 | 12.50<br>14.00 | 0.75<br>1.50 | 1.00<br>1.50 | -    | Dental burrs, dental cutter,<br>surgical needles                    |  |  |
| Ergste <sup>®</sup> 1.4104YU             | AISI 430F          | min.<br>max. | 0.10<br>0.17                  | 1.00         | 1.50         | 0.040  | 0.15<br>0.35 | 15.50<br>17.50 | -            | -            | -    | Instrument handholds  |  |  |
| Ergste <sup>®</sup> 1.4057YN             | AISI 431           | min.<br>max. | 0.12<br>0.22                  | 1.00         | 1.50         | 0.040  | 0.030        | 15.50<br>17.00 | 1.50<br>2.50 | -            | -    | Medical instruments, cutting tool                                   |  |  |
| Ergste <sup>®</sup> 9.9440YA             | AISI 440A          | min.<br>max. | 0.60<br>0.75                  | 1.00         | 1.00         | 0.040  | 0.030        | 16.00<br>18.00 | -            | 0.75         | -    | Dental applications,<br>dental instruments,<br>surgical instruments |  |  |
| 1RK91                                    | -                  | min.<br>max. | ≤0.02                         | ≤0.50        | ≤0.50        | ≤0.020 | ≤0.005       | 12.00          | _            | 4.00         | _    | Surgical needles, hex keys, screwdrivers                            |  |  |
| Ergste <sup>®</sup> 1.4112YL             | AISI 440B          | min.<br>max. | 0.75<br>0.95                  | 1.00         | 1.00         | 0.040  | 0.030        | 17.00<br>19.00 | -            | 0.95<br>1.30 | -    | Instrument parts, scalpels  |  |  |
| Ergste <sup>®</sup> 1.4123YN<br>(X15-TN) | -                  | min.<br>max. | 0.35<br>0.50                  | 1.00         | 1.00         | 0.040  | 0.015        | 14.00<br>16.00 | 0.50         | 1.00<br>2.50 | -    | Burrs, cutter, reamer, screwdrivers                                 |  |  |
| Ergste <sup>®</sup> 1.4125YL             | AISI 440C          | min.<br>max. | 0.95<br>1.20                  | 1.00         | 1.00         | 0.040  | 0.030        | 16.00<br>18.00 | -            | 0.40<br>0.80 | -    | Surgical instruments,<br>blades                                     |  |  |
|  |                    |              |                               |              |              |        |              |                |              |              |      |   |  |  |

### SPECIAL GRADES FOR MEDICAL AND DENTAL APPLICATIONS

#### Outstanding properties -

precipitation-hardenable grades

The precipitation-hardenable austenitic steels are characterized by higher corrosion resistance, although

they generally have a lower hardening potential compared to martensitic steels.

#### Precipitation hardenable grades for medical and dental

| Brand name                                  | Туре                | С                | S      | Si   | Mn    | Р       | S       | Cr             | Ni             | Мо           | Ti           | AI           | Cu           | Nb           |
|---|---------------------|------------------|--------|------|-------|---------|---------|----------------|----------------|--------------|--------------|--------------|--------------|--------------|
| Ergste <sup>®</sup> 1.4542GG                | AISI 630<br>17-4-PH | min.<br>max. 0.0 | 07 1   | .00  | 1.00  | 0.040   | 0.030   | 15.00<br>17.50 | 3.00<br>5.00   | -            | -            | -            | 3.00<br>5.00 | 0.15<br>0.45 |
| Ergste <sup>®</sup> 1.4568GA                | AISI 631<br>17-7-PH | min.<br>max. 0.0 | 09 1   | .00  | 1.00  | 0.040   | 0.030   | 16.00<br>18.00 | 6.50<br>7.75   | -            | -            | 0.75<br>1.50 | -            | -            |
| Ergste <sup>®</sup> 1.4543GG<br>(Alloy 455) | XM-16               | min.<br>max. 0.0 | 03 0   | .50  | 0.50  | 0.015   | 0.015   | 11.00<br>12.50 | 7.50<br>9.50   | 0.50         | 0.90<br>1.40 | -            | 1.50<br>2.50 | 0.10<br>0.50 |
| Ergste <sup>®</sup> 1.4614                  | -                   | min.<br>max. 0.2 | 20 0   | .250 | 0.250 | 0.015   | 0.010   | 11.00<br>12.50 | 10.75<br>11.25 | 0.75<br>1.25 | 1.5<br>1.8   | -            | -            | -            |
| 1RK91/9.9910                                | -                   | min.<br>max. ≤0  | ).02 ≤ | 0.5  | ≤ 0.5 | ≤ 0.020 | ≤ 0.005 | 12.0           | _              | 4.0          | _            | _            | _            | _            |

#### Outstanding properties -

grades for medical and dental applications

- \_ Particularly high strengths combined with tight
- tolerances
- \_ Especially stress-relieved
- $\_Allergy\-friendly$

#### \_ Bendable

\_Optimal cost-performance ratio

Chemical Composition (Mass-%)

- \_Versatile applications
- \_Various feature characteristic

#### Grades for medical and dental

| Brand name   | Туре                 |              | С            | Si           | Mn          | Р     | S            | Cr             | Ni             | Мо            | Typical application  |
|--|----------------------|--------------|--------------|--------------|-------------|-------|--------------|----------------|----------------|---------------|--|
| Ergste <sup>®</sup> 1.4310FB<br>Ergste <sup>®</sup> 1.4310FE*<br>Ergste <sup>®</sup> 1.4310FM<br>11R51HV, 1.4310VA | AISI 301             | min.<br>max  | 0.05<br>0.15 | 1.20         | 2.00        | 0.045 | 0.030        | 16.00<br>19.00 | 8.00<br>10.00  | -             | High-strength wire,<br>root canal-files,<br>dental instruments |
| Ergste <sup>®</sup> 9.9035   | MP35N <sup>®**</sup> | min.<br>max. | 0.025        | 0.15         | 0.15        | 0.015 | 0.01         | 19.00<br>21.00 | 33.00<br>37.00 | 9.00<br>10.50 | Orthodontic wire   |
| Ergste <sup>®</sup> 1.4105IU   | AISI 430F            | min.<br>max. | 0.08         | 1.50         | 1.50        | 0.040 | 0.15<br>0.35 | 16.00<br>18.00 | -              | -             | Shafts for rotating<br>instruments                             |
| Ergste <sup>®</sup> 1.4303SA   | AISI 305(L)          | min.<br>max. | 0.06         | 1.00         | 2.00        | 0.045 | 0.030        | 17.00<br>19.00 | 11.00<br>13.00 | -             | Dental applications made<br>by precision strip                 |
| Ergste <sup>®</sup> 1.4305UA   | AISI 303             | min.<br>max. | 0.12         | 1.00         | 2.00        | 0.060 | 0.15<br>0.35 | 17.00<br>19.00 | 8.00<br>10.00  | 0.70          | Surgical instruments, dental instruments, parts for braces     |
| Ergste 9.9007  | -                    | min.<br>max. | 0.15<br>0.25 | 0.20<br>0.60 | 9.5<br>12.5 | 0.020 | 0.010        | 16.50<br>18.00 | 0.05           | 2.7<br>2.7    | Amagnetic, nickel-free<br>needles, surgical implants           |

\* Remelted grade

\*\* MP35N<sup>®</sup> is a product and registered trademark of SPS Technologies, LLC in the EU and the USA.

ORTHOPEDICS OSTEOSYNTHESIS ORTHODONTICS TRAUMATOLOGY LABORATORY TECHNOLOGY SURGERY

1

### ZAPP'S CERTIFICATES AND APPROVALS



4041 MEDICAL ALLOYS







### »Ensuring quality means securing the future.«

» Quality is a critical factor in the manufacturing industry. A quality-focused company ensures that its products meet established standards and consistently meet customer expectations.

For 17 years, I have had the privilege of shaping my career at Zapp, a company known for high-quality metallic products. Throughout my extensive experience in the production of this historic company, I have not only gained comprehensive knowledge in manufacturing but also developed a deep understanding of the values and craftsmanship that underpin our product quality.

Today, I primarily support our customers in conducting optimal quality audits, certifications through external service providers and improvement processes within the company.

It is gratifying to be part of a team that is continuously committed to quality and innovation, while also preserving traditional craftsmanship.«

Daniela Fahrenholz Quality Management Schwerte location, Germany

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