




MEDICAL ALLOYS

New since 1701  
Zapp Precision Metals GmbH

ZAPP





The presented data, illustrations, graphics, stated measurements, and indications of weight as well as other data are meant to provide a description of our products and are non-binding average values. They do not represent conditional grades or guarantee a certain condition or durability. The displayed applications serve the purpose of illustration and, in regard to the versatility of our alloys, shall not be considered as a specification of condition or as a guarantee. The information herein cannot replace a thorough consultation for the selection of our products or their usage for specific applications. This brochure is not subject to change control.

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## ZAPP: FROM PAST GENERATIONS – FOR FUTURE GENERATIONS

A company with a more than a **300-year-long** tradition, worldwide presence, fast and reliable. This is who we are: Zapp. With our **experience** and **expertise**, we ensure your visions become reality. From past generations – for future generations! We are the partner you look for in your projects, and help you with the **first steps of fabrication** by **pre-cutting** and **straightening**. This way you can focus on the key processes of your production.

Wire, bar, profile, tubes, strip, CAD/CAM blanks, powder made from stainless steel, titanium, nickel/nickel-based alloys, specially made for your application.

The hunt for innovation, our intensive **quality management**, and the willingness to solve complex technical problems are our driving forces.

For 300 years, progress has helped us build a future with you for the next generations.

# WE KEEP MOVING FOR YOU

As complex as your applications, 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, flat wire, or powder.

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 ensure 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. We focus on cold processing.

## Our strengths

Broad range in milling, rolling, annealing, grinding

To be able to offer you the best materials, we obtain our material worldwide from premium manufacturers and finish it according to your needs. With our diverse manufacturing capabilities, we are flexible and able to provide the ideal material for your application.

State-of-the-art machines produce optimal surfaces and maintain closest dimensional tolerances. With offices in Europe, North America, and Asia, we are near you.

Our surgical needles have excellent surface conditions and high precision production tolerances.





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MEDICAL ALLOYS



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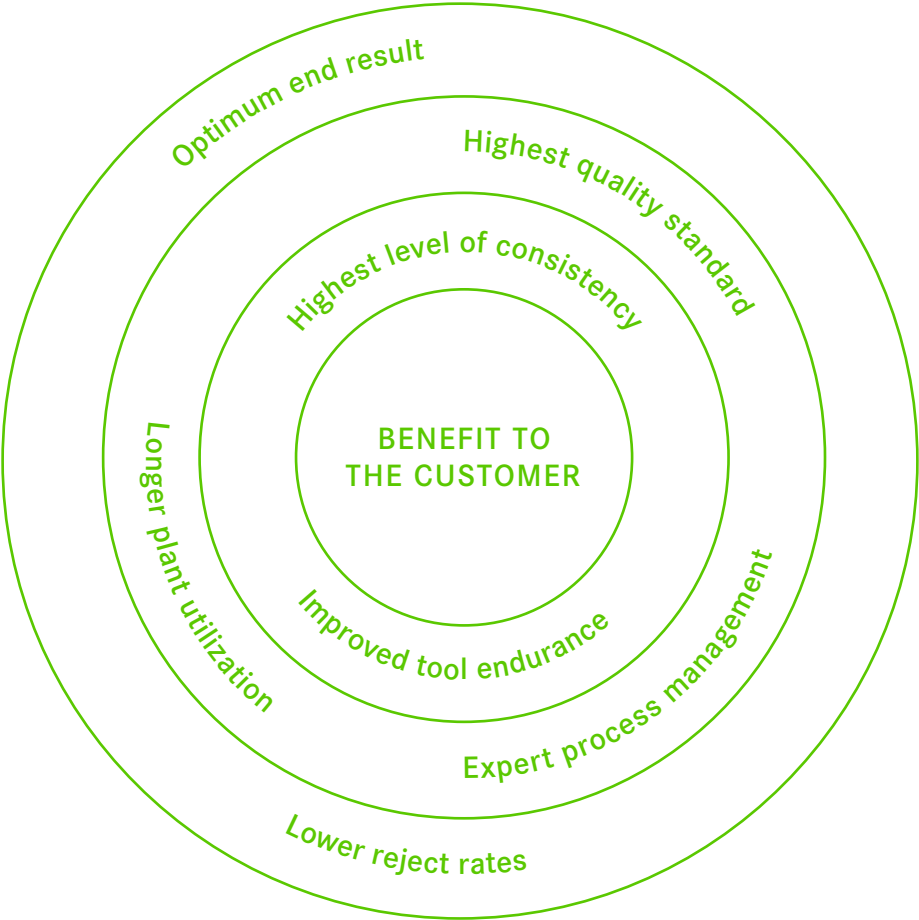
»I am looking forward  
to you, every day!«

»Every day in the Medical Alloys sales bureau, I look forward to supporting our clients with the challenges they face in the medical business. The cooperation with clients and those interested – whether it is traumatology, orthopaedics, or dental technologies – offers new and fascinating topics as well as interesting tasks for me.«

Moritz Krämer, Account Manager  
Medical Additive Materials  
Schwerte Location, Germany

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# HOW YOUR PRODUCTION BENEFITS FROM OUR SEMI-FINISHED PRODUCTS





# FORMS OF DELIVERY

## Wire

- \_ rings
- \_ coils
- \_ barrels
- \_ spools

## Bar

- \_ standard sizes available
- \_ customized

## Profile

- \_ rings
- \_ bars
- \_ spools

## Premium Wire

- \_ barrels
- \_ spools

## Precision Strip

- \_ rings
- \_ spools
- \_ bar strips
- \_ plates

## Cuttings

- \_ in defined shapes
- \_ round plates
- \_ customized

## Plates

- \_ standard sizes available
- \_ customized

## Tubes

- \_ standard sizes available
- \_ customized

## Powder



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





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»With a passionate  
focus on the customer.«

»The variety of application possibilities keeps my passion in the sales department alive – even after more than 25 years. With our highly specialized product palette, we supply customers worldwide, each from a different industry branch. As an account manager, support for my customers on site in medical technology is close to my heart. Therefore, I gladly travel to distant places like India and the USA. The customer is my highest priority.«

Claudia Weigand, Account Manager  
Medical Alloys  
Schwerte Location, Germany

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# BAR: A STEP AHEAD

Our bar steels are always one tolerance category better. A **superior grinding technique** ensures an excellent finish. For quality assurance, we employ a **high-cost crack testing method**. We achieve demanding magnetic properties on a **consistent basis** (e. g., soft magnetic bars for valve systems, or demagnetized bars and bar

steel with exceptionally low degrees of susceptibility to magnetization). Our wide product range also includes **very thin bars of exceptional straightness** (chamfered, if required).

## Thickness tolerances

ISO 286-2 (ISO h11-h5)

Closer or different tolerances according to customer requirements

## Finishes

Drawn, straightened

Drawn, straightened, polished

Drawn, ground, polished

Drawn, straightened, ground, polished

Drawn, annealed, straightened

Drawn, annealed, ground

Drawn, annealed, ground, polished

Drawn, annealed, straightened, ground, polished

## Surface roughness $\varnothing$ 0.039 – 1.57" ( $\varnothing$ 1.0 – 40 mm)

Ground, polished

$R_{\max.} \leq 5 \mu\text{m}/R_z \leq 3 \mu\text{m}/R_a \leq 0.5 \mu\text{m}$

$R_{\max.} \leq 2.5 \mu\text{m}/R_z \leq 2 \mu\text{m}/R_a \leq 0.3 \mu\text{m}$

## Straightness $\varnothing$ 0.039 – 1.57" ( $\varnothing$ 1.0 – 40 mm)

Up to 0.02" (0.5 mm)/40.0" (1 m) as standard

Up to 0.008" (0.2 mm)/40.0" (1 m) on request

Specially straightened on request

## Size range

$\varnothing$  0.03 – 3.94" (0.7 – 100 mm) round

## Quality standards

Annealed and/or cold hardened in accordance with EN 10088-3

Closer and higher mechanical, technological or physical values according to customer requirements

Crack tested in accordance to EN 10277-1 Table 1, class 1–4

Tempered

Demagnetized

Defined magnetic characteristics

Ultrasonic tested ( $\varnothing$  0.24 – 0.98"/ $\varnothing$  6 – 25 mm), circular disk-shaped reflector at least 0.03" (0.7 mm) or better

## Bar length (DIN 10278, manufacturing, stock, exact lengths)

$\varnothing$  0.03 – 0.06" (0.7 – 1.5 mm) in lengths

from 10.0 – 80.0" (250 – 2,000 mm)

$\varnothing$  0.06 – 0.2" (1.5 – 5 mm) in lengths

from 10.0 – 160.0" (250 – 4,000 mm)

$\varnothing$  0.2 – 3.94" (5 – 100 mm) in lengths

from 80 – 240" (2,000 – 6,000 mm)

Larger diameters, other bar lengths and tolerances on request

## End machining

On one or both sides

Chamfered 90° (45°)

Pointed 60° (30°)

Face chamfered

## Standards

Production according to national and international standards DIN/ISO/ASTM (e.g., EN 10088-3\*/ISO 5832-1/ASTM F138)

\* Surfaces requirements of ground bars acc. the standard need to be agreed on in the individual case.





# 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.

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

What are your requirements for a wire?  
Challenge us!

## 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/bondered

Zapp-coat

Nickel (Ni) coated wire

Cu-Sn coated bright drawn wire

Specially coated

ASTM A555, ASTM A580

## Size range

0.006 – 0.8" (0.15 – 20 mm) diameter

## Quality standards

Annealed, cold-hardened in accordance with EN 10088-3, ISO 5832-1

Spring hard to EN 10270-3

Eddy current testing (Sweden)

Closer mechanical, technological or physical values for your specific application

## Forms of delivery

Coils up to 2,095 lbs (950 kg)

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





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MEDICAL ALLOYS

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»I grind your bars  
perfectly and precisely.«

»So far, I've spent all my career at Zapp. I started with a student internship grade 9, and after a summer job I started directly with my training as a tool mechanic. I have worked with Zapp for 17 years now.

Due to new techniques, it never gets boring, because I am constantly challenged to meet the requirements I set myself. The bars I work must always be in optimal condition and maintain the same high quality. That's also something the customer should notice.«

Markus Globisch, Grinder  
Precision Wire  
Schwerte Location, Germany

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# 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, hardened or colored.




### Size range

Width 0.02 – 0.59" (0.5 – 15 mm)

Thickness 0.004 – 0.16" (0.1 – 4 mm)

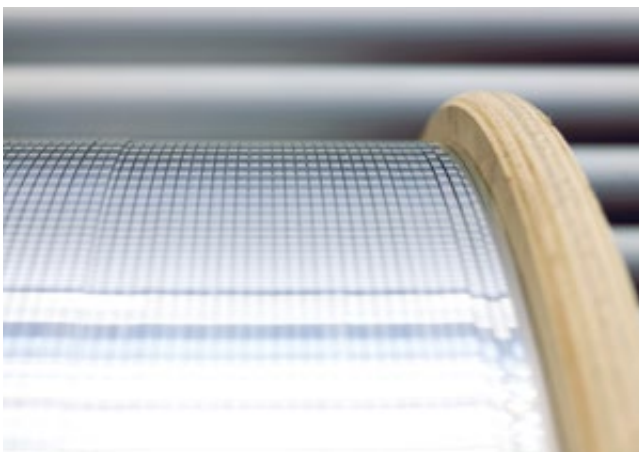
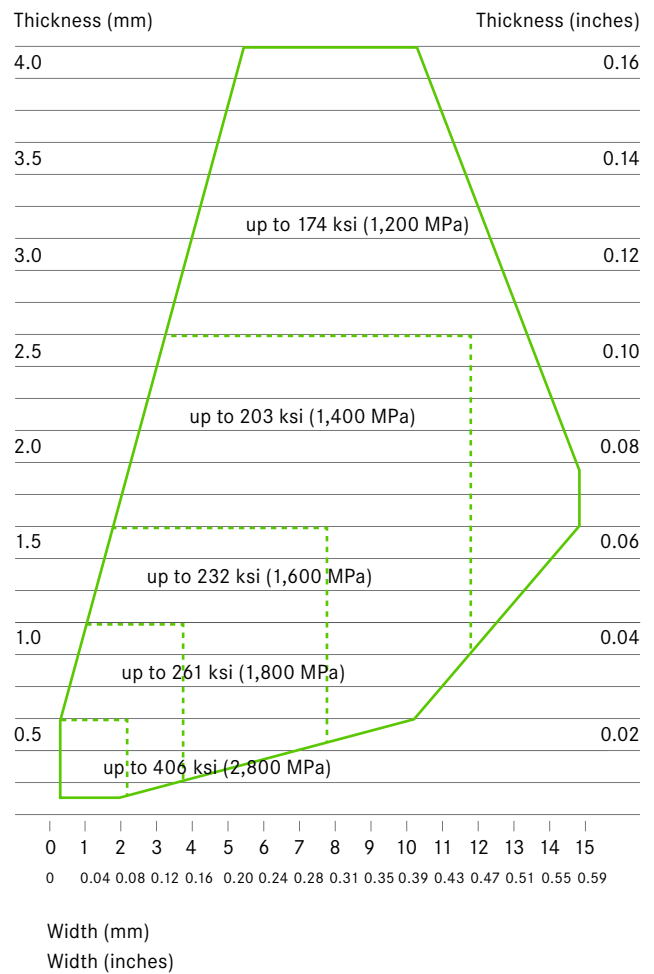
Individual tolerances

### 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



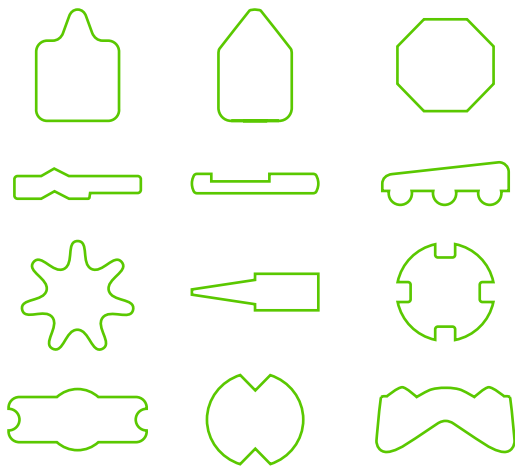
# PROFILE: MINIMAL MACHINING, COMPLEX SHAPES

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 0.01" (0.3 mm) to a 2.48 x 0.25" (63 x 6.35 mm) 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 354" (9,000 mm) 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 0.016 – 2.5" (0.3 – 63.50 mm)

Thickness 0.01 – 1.34" (0.3 – 34 mm)

## 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 354" +/- 0.2" (9,000 mm +/- 5 mm)

Spools to EN 60264-2-1

Packet wrapped coils

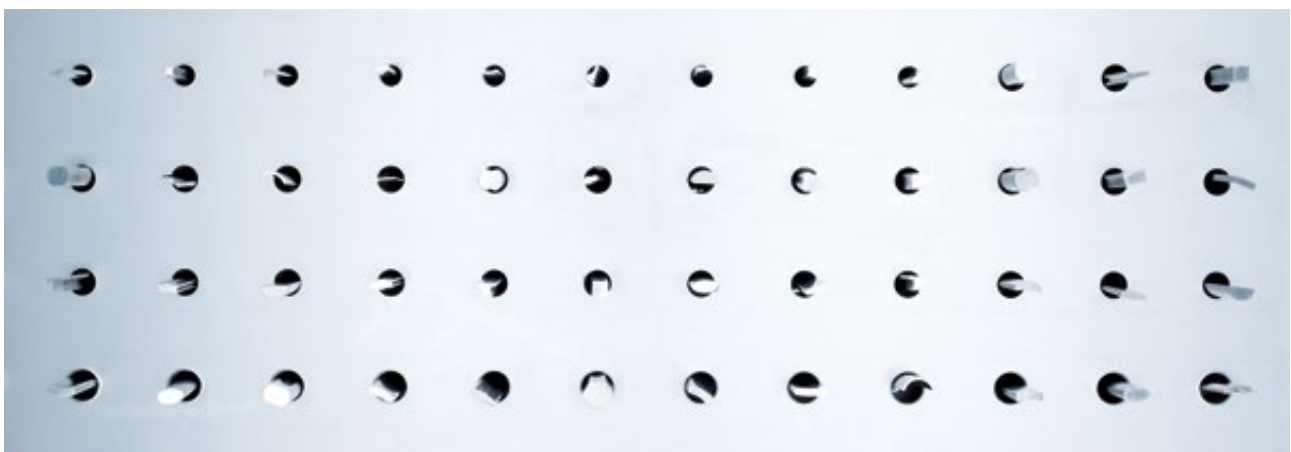
Special spools of 22 – 4,400 lbs (10 – 2,000 kg)

Chamfered or sawn bar ends

Forms of delivery depend on the cross-profile

## Standards

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







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## »I take care of the optimal profile.«

»For more than 40 years, it has been my task at Zapp to ensure profiles are manufactured to perfection. In 1974, the training was called toolmaker, because back then we made everything by hand and learned from scratch.

Today we offer more than 5,000 profiles and stock around 12,000 tools. The computer-controlled machines now work much more precisely and accurately than before. But experience is still very important to make a product that fits the customer's requirements.

I like to share this knowledge with the young generation. Because only the right combination of technology, knowledge, and precise machining bring us to the goal of producing a first-class profile. And that should still be the case tomorrow!«

Edwin Rinke, Tool Mechanic  
Schwerte Location, Germany

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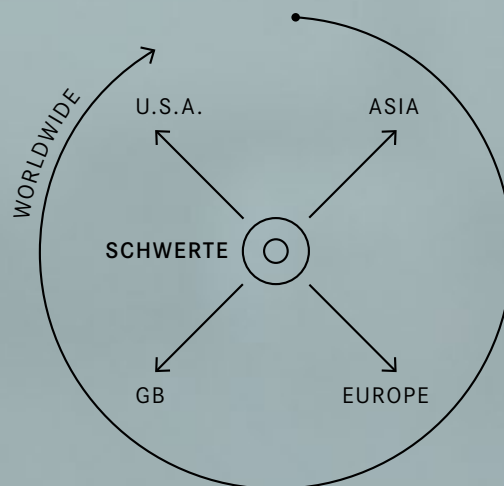
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## »We contribute to our customers success!«

»Medical technology deals with high-quality and sensitive products that have various applications and always challenge us in terms of new requirements or new materials with special norms.

Good communication with the customer is very important to me, as we can built up a trustworthy relationship. If the customer is satisfied with my consultation and our products, success on both sides is guaranteed.«

Alexandra Hackenberg, Inside Sales  
Medical Alloys  
Schwerte Location, Germany



# MEDICAL ALLOYS – PRODUCT PORTFOLIO

These alloys	DIN EN	Developed and manufactured for you	For your application
<b>Special Implant Materials</b>		<b>Bars</b>	Bone screw
Austenite, AISI 316LVM	1.4441	0.7 – 100 mm	Bone nail
Austenite, alloy 734	1.4472	drawn, peeled, ground, polished	Bone plate
Austenite, nickel free	9.9007	chamfered, centered, pointed	Intra-medullary nail
Co-Ni-Cr-Mo-alloy implant	9.9035	annealed, cold worked, stress released	Joint replacement
Co-Cr-Mo, forging-alloy	9.9135	straightness 0.5 mm/m on demand up to 0.2 mm/m	Shoulder, hip, knee
Co-Cr-W-Ni-alloy	2.4964HL	special surface roughness up to Ra < 0.3 µm	Spinal implant
Pure titanium grade 1	3.7025	ISO 286-2 in tolerances ISO h11 to ISO h05	Endoprosthesis
Pure titanium grade 2	3.7035	integrated crack detection	Dental implant
Pure titanium grade 3	3.7055		Maxillofacial surgery
Pure titanium grade 4	3.7065		Vascular surgery
Titanium alloy Ti6AL4V ELI	3.7165		Cerclage
Titanium alloy Ti15Mo	9.9150		Fixation system
Titanium alloy Ti6AlNb7	9.9367		Surgical needle
<b>Instrument grades</b>		<b>Fine Wire and Premium Wire</b>	Instrument
Martensite 13% Cr, AISI 420A	1.4021	0.15 – 20 mm	Bone saw
Martensite 13% Cr, AISI 420B	1.4028	bright drawn, diamond drawn, specially coated	Abrador
Martensite 13% Cr, AISI 420X	1.4031	ISO 286-2 in tolerances ISO h11 to ISO h05	Rotating instrument
Martensite 13% Cr, AISI 420C	1.4034	crack detected products	Dental burr
Martensite 13% Cr, AISI 420C(+S)	1.4035		Dental cutter
Martensite 13% Cr, AISI 420F mod.	1.4197		Orthodontic brace
Martensite 17% Cr, AISI 430F	1.4104		Scalpel
Martensite 17% Cr, AISI 431	1.4057	<b>Profile</b>	Laboratory equipment
Martensite 17% Cr, AISI 440A	9.9440YA	0.3 x 0.3 mm – 63 x 6.35 mm	Stamping and bending part
Martensite 17% Cr, AISI 440A mod	9.9440YL	milled, rolled, drawn	
Martensite 17% Cr, AISI 440B	1.4112	dull, bright, extreme bright	
Martensite 17% Cr	1.4122	square, hexagonal, octagonal	
Martensite 17% Cr, AISI 420 mod	1.4123YN	½, ⅓ and ¼ tube	
Martensite 17% Cr, AISI 440C	1.4125	implant-special shapes	
Martensite	1.4108	»near net shape«	
<b>Precipitation hardenable steels</b>		precision profile according drawing	
Special alloy 17-4-PH	1.4542	water-jet-cut blank	
Special alloy 17-7-PH	1.4568		
Special alloy XM-16, alloy 455	1.4543	<b>Precision Strip</b>	
Austenite	1.4310	thickness from 0.02 – 2.50 mm	
<b>Special materials</b>		width from 2 – 1,066 mm	
Austenite, nickel-free	1.4456	sheets up to 6.00 mm thickness	
Co-Ni-Cr-Mo-alloy, dental	9.9035	cold worked, final annealed	
Ferrite	1.4105	tempered	
Austenite	1.4301		
Austenite	1.4303	<b>Plates</b>	
Austenite	1.4305	thickness: 0.5 – 155 mm	
Austenite	1.4306	width: 914 – 2,000 mm	
Austenite	1.4571	length: 2,000 – 6,000 mm	
		square or in circular blanks	
		water-jet-cut	
		cuttings acc. to customers requirements	
		<b>Tubes</b>	
		thin-walled, seamless < 20 mm	
		drawn, ground	



# METAL POWDER FOR ADDITIVE PRODUCTION

## New in our portfolio:

**fine, spherical, metallurgical powder**

- \_ optimal flowability and bulk density
- \_ customized fractioning
- \_ customized chemical composition

Metallurgical powder made with **gas-atomizers** are available in a wide range of standard alloys (e.g., titanium, CoCrMo, steel). They are applicable for all **additive manufacturing techniques** and applications. The spherical form of the powder particles guarantee an **optimal flowability**. The bulk density ensures that the succeeding layers are put on in a coherent and consistent way.

## Material range:

- \_ TiAlAV/Titanium grade 23
- \_ 316L/1.4404
- \_ 17-4 PH/1.4542
- \_ CoCr28MO6

Additional material available on demand.

You need metal powder?  
Ask us!



# SPECIAL IMPLANT MATERIALS

## What you can expect

- \_ steel materials specifically chosen for end products
- \_ national and international regulations
- \_ customized material properties
- \_ optimized properties in regard to biocompatibility, fatigue strength, degree of purity
- \_ avoidance of allergies: substitution of nickel with manganese and nitrogen
- \_ high corrosion resistance

## Special implant materials

Brand name	Material-norms	Chemical composition (mass-%)												
		C	Si	Mn	P	S	Cr	Ni	Mo	Nb	Cu	N	Fe	
Ergste® 1.4441LA	ASTM F138	min.					17.00	13.00	2.25	-			bal	
	ASTM F139 ISO 5832-1	max.	0.030	0.75	2.00	0.025	0.01	19.00	15.00	3.00		0.50	0.10	
Ergste® 1.4472RN	ASTM F1586	min.		2.00			19.50	9.00	2.00	0.25		0.25	bal	
	ISO 5832-9	max.	0.080	0.75	4.25	0.025	0.01	22.00	11.00	3.00	0.80	0.25	0.50	
Ergste® 9.9007CN	ASTM F2581	min.	0.15	0.20	9.50		16.50		2.70	-		0.45	bal	
		max.	0.25	0.60	12.50	0.020	0.01	18.00	0.05	3.70		0.25	0.55	
Ergste® 1.4456CA	Zapp-Special Analysis	min.		16.00			16.00		1.80	-	-	<	bal	
		max.	0.10	1.00	20.00	0.05	0.05	20.00	0.20	2.50		0.1		
316 LVM	ASTM F138	min.	≤			≤	≤				-	0.10	0.10	-
		max.	0.025	0.6	1.7	0.025	0.003	17.5	14.0	2.8				
High N	ASTM F1586	min.	≤	<	4.0	≤	≤					≤		
		max.	0.06	0.06		0.025	0.003	20.5	9.5	2.4	0.3	0.20	0.4	-

Brand name	Material-norms	Chemical composition (mass-%)													
		C	Si	Mn	P	S	Cr	Ni	Mo	W	Fe	Ti	N	Co	
Ergste® 9.9035	ASTM F562	min.					19.00	33.00	9.00	-			-	bal	
	ISO 5832-6	max.	0.025	0.15	0.15	0.015	0.01	21.00	37.00	10.50		1.00	1.00		
Ergiloy® 9.9135HL	ASTM F1537 (alloy 1)	min.				-	26.00		5.00	-				bal	
	ISO 5832-12 (low C)	max.	0.14	1.00	1.00		30.00	1.00	7.00		0.75		0.25		
Ergiloy® 2.4964HL	ASTM F90	min.					19.00	9.00	-	14.00		-	-	bal	
	ISO 5832-5	max.	0.15	0.40	2.00	0.04	0.030	21.00	11.00	16.00	3.00				

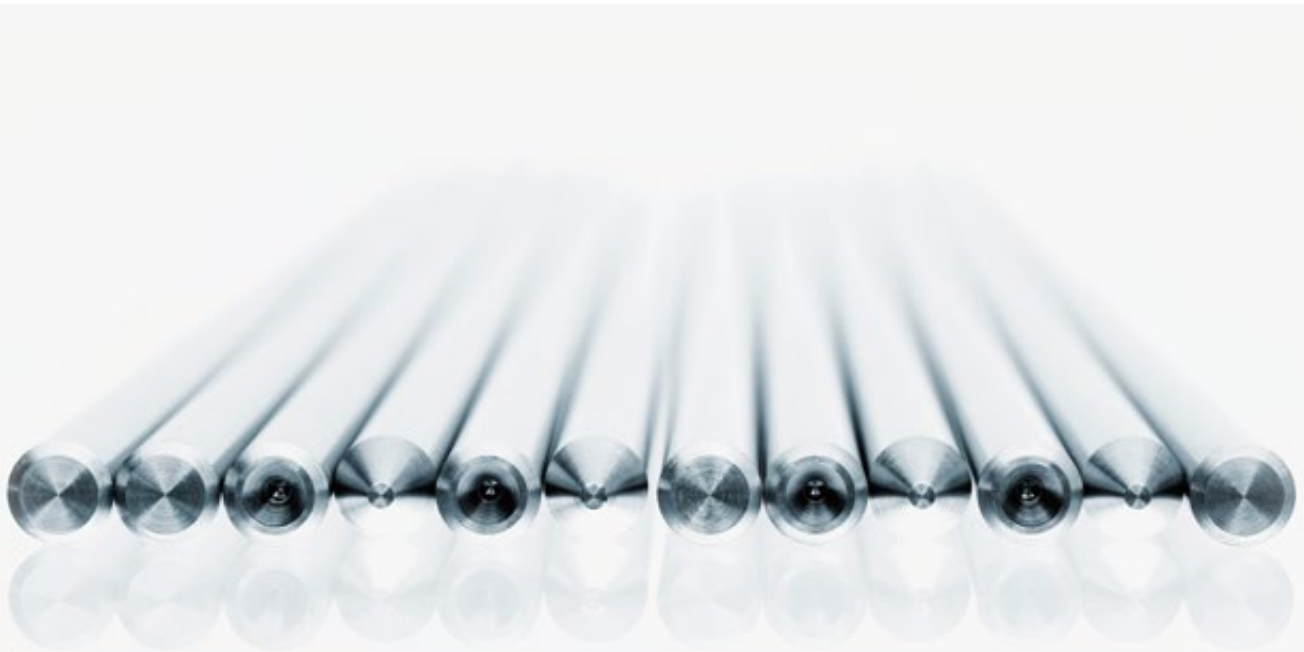
# IMPLANT MATERIALS MADE OF TITANIUM

## Your advantages

- \_ pure titanium grade 1,2,3,4
- \_ titanium alloys: TiAl6V4 ELI remelted, TiMo15, TiAl6Nb7
- \_ entire range of strength and structure conditions – cold-twisted and annealed
- \_ improved machinability
- \_ increased corrosion properties
- \_ microstructural setup with extra thin grain size
- \_ close tolerances, outstanding straightness, maximum surface finish
- \_ outstanding biocompatibility

## Implant materials made of titanium

Brand name	Material-norms	Chemical composition (mass-%)										
		C	Fe	O	H	N	Al	V	Mo	Nb	Ti	
Ergitan® 3.7025MG	ASTM F67 ISO 5832-2	min. max.	0.080	0.20	0.18	0.0125	0.03	-	-	-	-	bal
Ergitan® 3.7035MG	ASTM F67 ISO 5832-2	min. max.	0.080	0.30	0.25	0.0125	0.03	-	-	-	-	bal
Ergitan® 3.7055MG	ASTM F67 ISO 5832-2	min. max.	0.080	0.30	0.35	0.0125	0.05	-	-	-	-	bal
Ergitan® 3.7065MG	ASTM F67 ISO 5832-2	min. max.	0.080	0.50	0.40	0.0125	0.05	-	-	-	-	bal
Ergitan® 3.7165MG	ASTM F136 ISO 5832-3	min. max.	0.080	0.25	0.13	0.0120	0.05	5.5 6.5	3.5 4.5	-	-	bal
Ergitan® 9.9150MG	ASTM F2066 ISO 5832-14	min. max.	0.100	0.10	0.20	0.0150	0.05	-	-	14.0 16.0	-	bal
Ergitan® 9.9367MG	ASTM F1295 ISO 5832-11	min. max.	0.080	0.25	0.20	0.009	0.05	5.5 6.5	-	-	6.5 7.5	bal



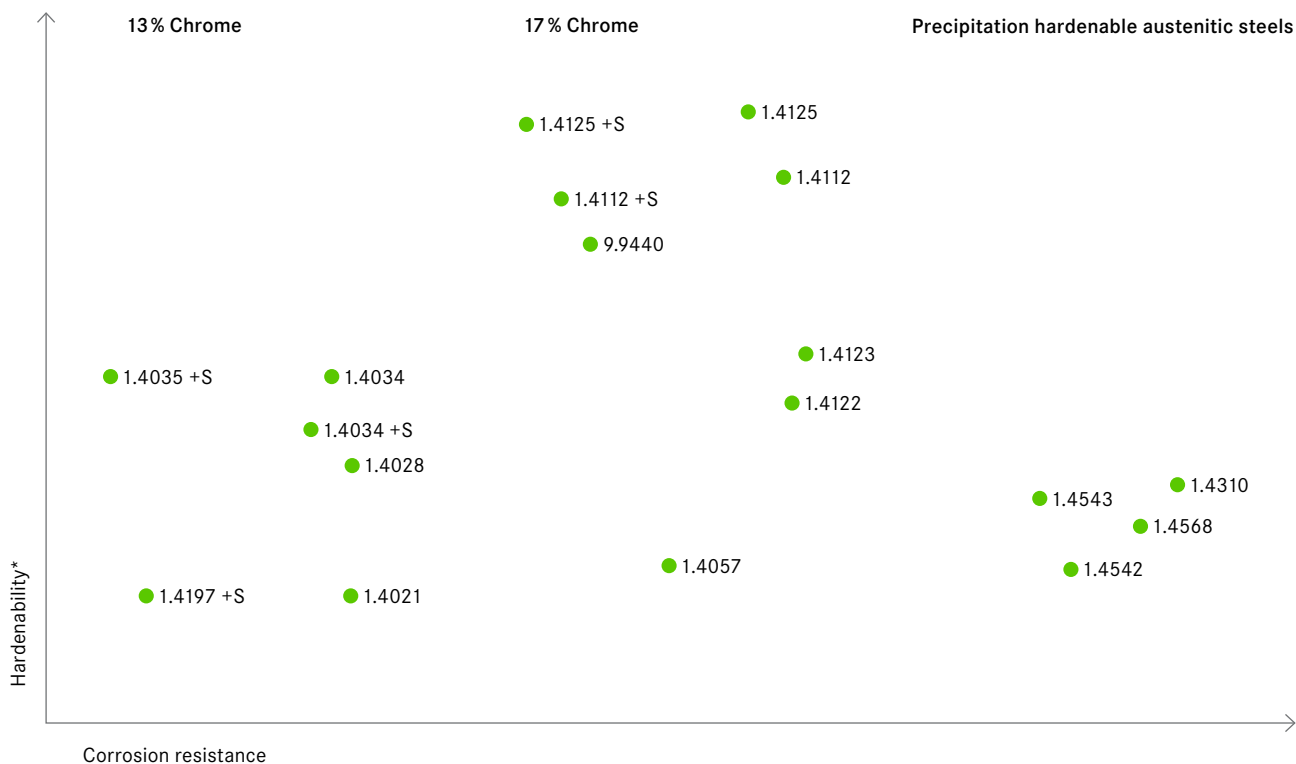
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# MATERIALS FOR INSTRUMENTS

## Your advantages

- \_ highest possible variation with hardenable material for usage according to ASTM F899
- \_ maximum corrosion resistance of martensitic qualities
- \_ optimal machining possibilities
- \_ close tolerances, outstanding straightness, maximum surface finish
- \_ high-tech special grades

## Martensitic grades



\* hardness according to specific heat treatment from the solution annealed condition

# MATERIALS FOR INSTRUMENTS – MARTENSITIC

## Materials for instruments

Brand name	Type	Chemical composition (mass-%)										Typical application
		C	Si	Mn	P	S	Cr	V	Mo	N		
Ergste® 1.4021YB	AISI 420A	min. max.	0.16 0.25	1.00	1.00	0.040	0.030	12.00 14.00	1.00	-	-	Instruments, abrasors
Ergste® 1.4028YN	AISI 420B	min. max.	0.26 0.35	1.00	1.50	0.040	0.030	12.00 14.00	-	-	-	Bone saws, rotating instruments, cutter
Ergste® 1.4028MO	AISI 420B (+Mo)	min. max.	0.34 0.38	1.00	1.00	0.040	0.030	13.00 14.00	-	0.90 1.10	-	Instruments, abrasors, bone saws
Ergste® 1.4031YC	AISI 420X	min. max.	0.36 0.42	1.00	1.00	0.040	0.030	12.50 14.50	-	-	-	Surgical needles
Ergste® 1.4034YN	AISI 420C	min. max.	0.42 0.50	1.00	1.00	0.040	0.030	12.50 14.50	1.00	-	-	Instrument handholds, abrasors, cutter
Ergste® 1.4034YK	AISI 420C	min. max.	0.43 0.50	1.00	1.00	0.040	0.030	13.00 14.50	1.00	-	-	Instrument handholds, abrasors, burrs
Ergste® 1.4035YU	AISI 420C (+S)	min. max.	0.43 0.50	1.00	1.00	0.040	0.30	12.50 14.50	1.00	-	-	Precision instruments, cutter
Ergste® 1.4108	-	min. max.	0.28 0.34	0.30 0.80	0.30 0.60	0.020	0.010	14.50 16.00	-	0.95 1.10	0.30	Drills, screwdrivers, chisels, saw blades, cutting tools
Ergste® 1.4197YU	AISI 420F mod.	min. max.	0.20 0.26	1.00	2.00	0.040	0.27	12.50 14.00	0.75 1.50	1.00 1.50	-	Dental burrs, dental cutter, surgical needles
Ergste® 1.4104YU	AISI 430F	min. max.	0.10 0.17	1.00	1.50	0.040	0.35	15.50 17.50	-	-	-	Instrument handholds
Ergste® 1.4057YN	AISI 431	min. max.	0.12 0.22	1.00	1.50	0.040	0.030	15.50 17.00	1.50 2.50	-	-	Medical instruments, cutting tools
Ergste® 9.9440YA	AISI 440A	min. max.	0.60 0.75	1.00	1.00	0.040	0.030	16.00 18.00	-	0.75	-	Dental applications, dental instruments, surgical instruments
Ergste® 1.4112YL	AISI 440B	min. max.	0.75 0.95	1.00	1.00	0.040	0.030	17.00 19.00	-	0.95 1.30	-	Instrument parts, scalpels
Ergste® 1.4122YL	-	min. max.	0.33 0.45	1.00	1.50	0.040	0.030	15.50 17.50	1.00	0.80 1.30	-	Chisels, abrasors, cutting instruments
Ergste® 1.4123YN (X15-TN)	-	min. max.	0.35 0.50	1.00	1.00	0.040	0.015	14.00 16.00	0.50	1.00 2.50	-	Burrs, cutter, reamer, screwdrivers
Ergste® 1.4125YL	AISI 440C	min. max.	0.95 1.20	1.00	1.00	0.040	0.030	16.00 18.00	-	0.40 0.80	-	Surgical instruments, blades



# SPECIAL STEEL FOR MEDICAL AND DENTAL APPLICATIONS

## Outstanding properties – precipitation hardenable materials

The precipitation-hardenable austenitic steels provide a higher corrosion resistance in comparison to martensitic steels, with a higher potential for hardenability.

### Precipitation hardenable materials for medical and dental

Brand name	Type	Chemical composition (mass-%)												
		C	Si	Mn	P	S	Cr	Ni	Mo	Ti	Al	Cu	Nb	
Ergste® 1.4310FB Ergste® 1.4310FE*	AISI 301	min. max.	0.05 0.15	1.20	2.00	0.045	0.030	16.00 19.00	8.00 10.00	-	-	-	-	-
Ergste® 1.4542GG	AISI 630 17-4-PH	min. max.	0.07 0.07	1.00	1.00	0.040	0.030	15.00 17.50	3.00 5.00	-	-	-	3.00 5.00	0.15 0.45
Ergste® 1.4568GA	AISI 631 17-7-PH	min. max.	0.09 0.09	1.00	1.00	0.040	0.030	16.00 18.00	6.50 7.75	-	-	0.75 1.50	-	-
Ergste® 1.4543GG (Alloy 455)	XM-16	min. max.	0.03 0.03	0.50	0.50	0.015	0.015	11.00 12.50	7.50 9.50	0.90 0.50	1.40	-	1.50 2.50	0.10 0.50

## Outstanding properties – material for medical and dental applications

- \_ extreme high strength in combination with close tolerances
- \_ low-tension
- \_ suitable for allergies
- \_ flexible
- \_ optimal cost-benefit ratio
- \_ diverse application possibilities
- \_ various characteristic attributes

### Special materials for medical and dental

Brand name	Type	Chemical composition (mass-%)										Typical application
		C	Si	Mn	P	S	Cr	Ni	Mo			
Ergste® 1.4310FB Ergste® 1.4310FE*	AISI 301	min. max.	0.05 0.15	1.20	2.00	0.045	0.030	16.00 19.00	8.00 10.00	-	-	High-strength wire, root canal-files, dental instruments
Ergste® 1.4456CA	-	min. max.	0.10 0.10	1.00	16.00 20.00	0.050	0.050	16.00 20.00	0.20	1.80 2.50	-	Nickel-free dental wire, surgical needles
Ergste® 9.9035	MP-35N	min. max.	0.025 0.025	0.15	0.15	0.015	0.01	19.00 21.00	33.00 37.00	9.00 10.50	-	Orthodontic wire
Ergste® 1.4105IU	AISI 430F	min. max.	0.08 0.08	1.50	1.50	0.040	0.35	0.15 18.00	16.00	-	-	Shafts for rotating instruments
Ergste® 1.4303SA	AISI 305(L)	min. max.	0.06 0.06	1.00	2.00	0.045	0.030	17.00 19.00	11.00 13.00	-	-	Dental applications made by precision strip
Ergste® 1.4305UA	AISI 303	min. max.	0.12 0.12	1.00	2.00	0.060	0.35	0.15 19.00	17.00 19.00	8.00 10.00	0.70	Surgical instruments, dental instruments, parts for braces

\* re-melted grade

ORTHOPEDICS OSTEOSYNTHESIS  
ORTHODONTICS TRAUMATOLOGY  
LABORATORY MEDICINE SURGERY





ZAPP CERTIFICATIONS  
AND LOGISTICAL SYSTEMS



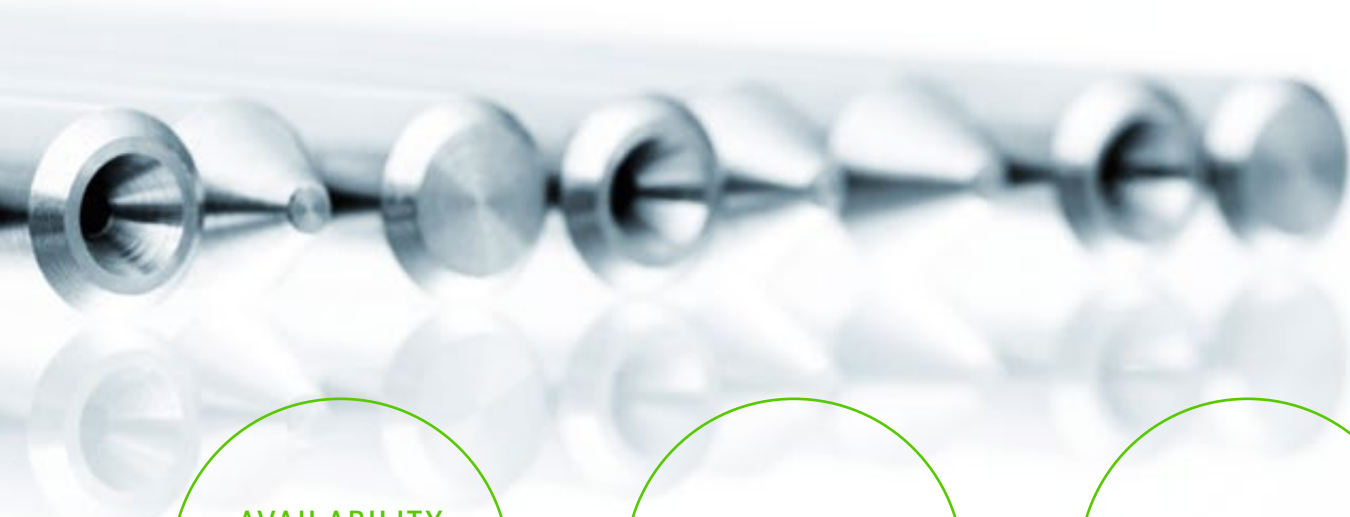
**3031**

MEDICAL ALLOYS

**RESPONSIBILITY**

**SAFETY**

**DILIGENCE**



**AVAILABILITY**  
By special delivery-,  
storage- and  
logistical systems

**RELIABILITY**

**CUSTOMIZED  
PRODUCTION**

National and  
international standards  
**STANDARDS  
REQUIREMENTS**

**ISO 50001**  
For the Zapp Group  
Germany

**ISO 9001**  
For the Zapp Group



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»My aspiration: quality, customer,  
audit, satisfaction.«

»I am in direct contact with the customers whenever they want to convince themselves of the quality we offer and apply for an audit. Then we arrange a meeting, plan the visit, and prepare the audit.

My personal goal is for people to view our company as a quality-conscious supplier and partner. The customer should be content with his visit and the outcome. The protection of our know-how is just as important. Therefore, every audit holds a new challenge.«

Axel Marquis, Performance & Quality Management  
Unna Location, Germany

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