

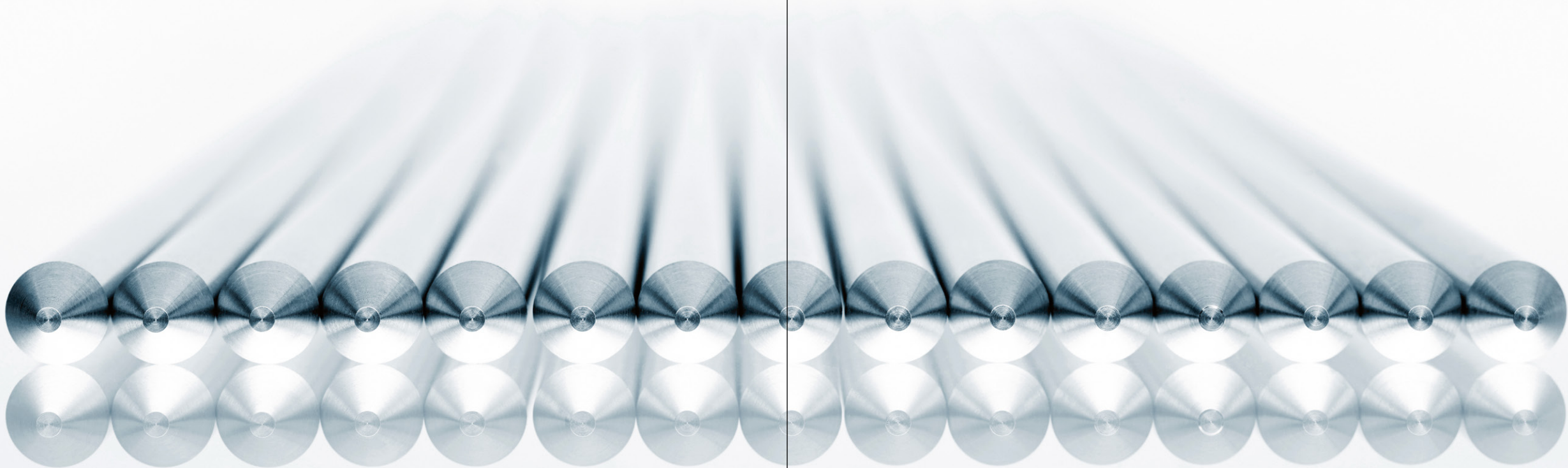
PRECISION BAR

New since 1701  
Zapp Precision Wire, Inc.

ZAPP



THE CHALLENGES OF TODAY  
ARE THE TRADITIONS OF TOMORROW.





## 16 SITES ARE MOVING FOR YOU

Applications can be complex. You define the product features, and we provide the material with a variety of processing and finishing options tailored to your specific needs. Whether it is 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 continue to improve remain on 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.

### Reliable material, highly repeatable

Only those who supply consistent product quality create the basis for a smooth production. We focus on cold processing.

**Our strengths:**  
Extensive manufacturing. Drawing. Rolling. Heat treating. Precision grinding.

In order to always be able to offer you the best materials, we obtain our material from premium melt sources and process it according to your needs. With our diverse manufacturing capabilities, we are flexible and able to provide the best 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 nearby.

## BAR: A CLASS BETTER

Our superior grinding equipment and techniques ensure an excellent finish. For quality assurance, we use state-of-the-art non-destructive testing. We achieve precise magnetic properties every time. Our wide product range also includes very small diameter bars of exceptional straightness.

### Size range

Ø 0.003 - 3.94" (0.7 - 100 mm) round

### Dimensional 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 Ø 0.039 - 0.157" (Ø 1.0 - 40 mm)

Ground, polished

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

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

Straightness Ø 0.039 - 0.157" (Ø 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

### 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 Ø 0.24 - 0.98" (Ø 6 - 25 mm), circular disk-shaped reflector at least 0.028" (0.7 mm) or better

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

Ø 0.03 - 0.06" (0.7 - 1.5 mm) in lengths from 10.0 - 80.0" (250 - 2,000 mm)

Ø 0.06 - 0.2" (1.5 - 5 mm) in lengths from 10.0 - 160.0" (250 - 4,000 mm)

Ø 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 A838)

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



# CHOICE OF MATERIALS

Zapp brand names Europe	EN DIN	AISI	UNS	Other designations/trade names
<b>Selected carbon steels/ low alloyed steels</b>				
Ergste <sup>7)</sup> 1.0611	1.0611	–	G10640	C62D
Ergste 1.0613	1.0613	–	G10690	C68D, SAE-No. 1069
Ergste 1.0617QC	1.0617	–	G10740	C72D, SAE-No. 1074
Ergste 1.0715	1.0715	–	~G12130	11SMn30
Westig <sup>7)</sup> 1.0759EA	~ 1.0759	–	~G10650 +S +Pb +Si	70SPb20, A60Pb
Westig 1.1268EA	~ 1.1268	–	–	Mh 97 (A100Pb)
Ergste 1.2243	1.2243	–	~G92590, ~H92590	61CrSiV5
Westig 1.2833EB	1.2833	~ AISI W2	~ T72302	100V1
<b>Ball bearing steels</b>				
Ergste 1.3505ER	1.3505	–	~G52986	100Cr6
<b>Ferritic stainless steels for solenoid applications</b>				
Ergste 1.4003IA	1.4003	–	S40977, S40977	X2CrNi12
Ergste 1.4003IB, ID	~ 1.4003	–	S41003	X2CrNi12
Ergste 1.4005IA, IH, ID	~ 1.4005	AISI 416	S41600	~X12CrS13
Ergste 1.4016IM, IH	1.4016	AISI 430	S43000	X6Cr17
Ergste 1.4105IB	~ 1.4105	–	–	~X6CrMoS17
Ergste 1.4105IL, IT	1.4105	AISI 430FR	–	X6CrMoS17; 430FR
Ergste 1.4105IM, IU	1.4105	AISI 430F	S43020	X6CrMoS17
Ergste 1.4105IQ	~ 1.4105 (+Cu)	–	–	–
Ergste 1.4113IL	1.4113	AISI 434	S43400	X6CrMo17-1
Ergste 1.4113IM, IU	1.4106	–	–	–
Ergste 1.4114IU	1.4114	XM-34	S18200	X6CrMoS19-2
Ergste 1.4511IA, IH	1.4511	AISI 430	S43000	X3CrNb17
<b>Martensitic stainless steels</b>				
Ergste 1.4005IU	1.4005	AISI 416	S41600	X12CrS13
Ergste 1.4006YH	1.4006	AISI 410	S41000	X12Cr13
Ergste 1.4021, YA, YB	1.4021	AISI 420, 420A	S42000	X20Cr13
Ergste 1.4024	1.4024	~ AISI 410	~S41000	X20Cr13
Ergste 1.4028YC, YN	1.4028	AISI 420, 420B	S42000	X20Cr13
Ergste 1.4028MO	1.4028	AISI 420, 420X (+Mo)	S42026	X30Cr13
Ergste 1.4031YA	~ 1.4031	AISI 420	S42000	~X39Cr13
Ergste 1.4031YC, YE	1.4031	AISI 420, ~420X	S42000	X39Cr13
Ergste 1.4034YS, YE, YK	1.4034	AISI 420, 420C	S42000	X39Cr13
Ergste 1.4034YN	1.4034	–	–	–
Ergste 1.4035YU	1.4035	AISI 420C (+S)	–	X46CrS13
Ergste 1.4037YR	1.4037	AISI 420	S420020	X65Cr13
Ergste 1.4057YE <sup>6)</sup>	1.4057	AISI 431	S43100	X17CrNi16-2
Ergste 1.4057YN	1.4057	~ AISI 431	–	X17CrNi16-2
Ergste 1.4104, YU	1.4104	~ AISI 430F	~S43020	X14CrMoS17
Ergste 1.4108 <sup>6)</sup>	1.4108	–	–	X30CrMoN15-1
Ergste 1.4112YE <sup>6)</sup> , YL	1.4112	–	–	X90CrMoV18
Ergste 1.4112YA	~ 1.4112	–	–	~X90CrMoV18
Ergste 1.4120YT	1.4120	–	–	X20CrMo13
Ergste 1.4122YA, YN, YL	1.4122	–	–	X39CrMo17-1
Ergste 1.4123YN <sup>6)</sup>	1.4123	AISI 420 Mod	S42000, S42025	X40CrMoVN16-2, X15TN <sup>5)</sup>
Ergste 1.4125YC, YE <sup>6)</sup>	1.4125	AISI 440C	S44004	X105CrMo17

Zapp brand names Europe	EN DIN	AISI	UNS	Other designations/trade names
<b>Martensitic stainless steels</b>				
Ergste 1.4197YU	1.4197	AISI 420F Mod	–	X20CrNiMoS13-1
Ergste 1.4418YB	1.4418	–	–	X4CrNiMo16-5-1
Ergste 9.9440YA	–	AISI 440A	S44002	–
Ergste 9.9440YL	–	~ AISI 440A	–	–
<b>Austenitic stainless steels</b>				
Ergste 1.4301FC, PA, PT, PV, PW	1.4301	AISI 304	S30400	X5CrNi18-10
Ergste 1.4301VD	1.4301, 1.4307	AISI 304, AISI 304L	S30400	X5CrNi18-10
Ergste 1.4303SA	1.4303	AISI 305	S30500	X4CrNi18-12
Ergste 1.4305	1.4305	AISI 303	S30300	X8CrNiS18-9
Ergste 1.4305UA, UB	1.4305	~ AISI 303	~S30300	X8CrNiS18-9
Ergste 1.4306LU	1.4306	AISI 304/AISI 304L	S30400/S30403	X2CrNi19-11/X5CrNi18-10
Ergste 1.4310FA, FB,FD, FE <sup>6)</sup> , FI, FV	1.4310	AISI 301/302	S30200	X10CrNi18-8
Ergste 1.4370WA	1.4370	–	–	X15CrNiMn18-8
Ergste 1.4374SN	1.4374	~ AISI 202	~S20200	X8CrMnNi18-9-5
Ergste 1.4401PA	1.4401	AISI 316	S31600	X5CrNiMo17-12-2
Ergste 1.4401SB	1.4401	AISI 316	S31600	X5CrNiMo17-12-2
Ergste 1.4404LB	1.4404	AISI 316L	S31603	X2CrNiMo17-12-2
Ergste 1.4404UA	~1.4404 (+S); 1.4598	–	–	X2CrNiMoCuS17-10-2
Ergste 1.4427UA	~1.4427	–	–	X12CrNiMoS18-11
Ergste 1.4435PM	1.4435	–	–	X2CrNiMo18-14-3
Ergste 1.4439LN	1.4439	–	–	X2CrNiMoN17-13-5
Ergste 1.4441LA <sup>6)</sup> , LN <sup>6)</sup>	1.4441	~ AISI 316L	S31673	X2CrNiMo18-15-3, ~316LVM
Ergste 1.4472RN	1.4472	–	S31675	X4CrNiMnMo21-9-4; Alloy 734 Rex 734 <sup>TM1)</sup>
Ergste 1.4539LN, LW	1.4539	–	N08904	X1NiCrMoCu25-20-5, 904L
Ergste 1.4541TA, TB, TS	1.4541	AISI 321	S32100	X6CrNiTi18-10
Ergste 1.4567, LC	1.4567	–	S30433	X3CrNiCu18-9-4, XM-7
Ergste 1.4570UA	1.4570	–	S30331	X6CrNiCuS18-9-2
Ergste 1.4571LU, TA	1.4571	AISI 316Ti	S31635	X6CrNiMoTi17-12-2
Ergste 1.4578SC	1.4578	–	–	X3CrNiCuMo17-11-3-2
Ergste 1.4598UA	1.4598	–	–	X2CrNiMoCuS17-10-2
Ergste 1.4828ZA	1.4828	–	–	X15CrNiSi20-12
Ergste 1.4845	1.4845	AISI 310S	S31008	X8CrNi25-21
Ergste 1.4961PW	1.4961	~ AISI 347H	~S34709	X8CrNiNb16-13
Ergste 1.4872ZA	1.4872	–	–	X25CrMnNi25-9-7
Ergste 1.4980TA	1.4980	–	S66286	X6NiCrTiMoVB25-15-2
Ergste 9.9200GA	–	–	–	–
Ergste 9.9201FN	1.4372	AISI 201	S20100	X12CrMnNiN17-7-5
Ergste 9.9244PC	–	–	–	UGI 244
Ergste 9.9253ZA	–	–	–	–
<b>Nickel-free austenitic grades</b>				
Ergste 1.3816CN	1.3816	–	–	X8CrMnN18-18
Ergste 9.9007CN	–	–	S29225	–
<b>Stainless steels ferritic-austenitic</b>				
Ergste 1.4362	1.4362	–	S32304	X2CrNiN23-4
Ergste 1.4462	1.4462	–	S31803	X2CrNiMoN22-5-3
Ergste 1.4462XA	1.4462	–	S31803	X2CrNiMoN22-5-3

1) Rex 734<sup>TM</sup> is a product and trademark of ATI Allvac.

2) MP35N<sup>®</sup>, Nimonic<sup>®</sup>, Inconel<sup>®</sup> and Monel<sup>®</sup> are trademarks of SPS Technologies, LLC in the EU and the U.S.A.

3) L605<sup>®</sup> is a product and registered trademark of SPS Technologies, LLC in the EU.

4) is a registered trademark of our contracted manufacturer HAYNES International, Inc., Kokomo, Indiana, U.S.A.

5) X15TN is a registered trademark of Aubert Duval

6) ESR

7) Ergste, Ergitan, Ergiloy and Westig are registered trademarks of Zapp AG.

Carbon steels for special applications in cold-rolled and hardened versions can be supplied to order. We welcome inquiries as per JIS and GOST.



# FOR MEDICAL APPLICATIONS

Zapp brand names Europe	EN DIN	AISI	UNS	Other designations/trade names
<b>Precipitation hardening stainless steels</b>				
Ergste <sup>7)</sup> 1.4542GE <sup>6)</sup> , GG	1.4542	AISI 630	S17400	X5CrNiCuNb16-4, 17-4 PH
Ergste 1.4543GG <sup>6)</sup>	1.4543	–	S45500	X3CrNiCuTiNb12-9, XM-16; Alloy 455
Ergste 1.4568GA	1.4568	AISI 631	S17700	X7CrNiAl17-7, 17-7 PH
Ergste 9.9204AG	~1.4597	–	S20430	204Cu
Ergste 9.9455GG <sup>6)</sup>	–	–	S45500	X3CrNiCuTiNb12-9, XM16, Custom 455
<b>Nickel/nickel base alloys</b>				
Ergiloy <sup>7)</sup> 2.4360HM	2.4360	–	N04400	NiCu30Fe, Monel <sup>®</sup> Alloy 400 <sup>2)</sup>
Ergiloy 2.4631HN	2.4631	–	~N07080	~Nimonic <sup>®</sup> Alloy 80A <sup>2)</sup>
Ergiloy 2.4632HN	2.4632	–	N07090	Nimonic <sup>®</sup> Alloy 90 <sup>2)</sup>
Ergiloy 2.4668HX	2.4868	–	–	–
Ergiloy 2.4669HX	2.4669	–	N07069, N07750	Inconel <sup>®</sup> X750 <sup>2)</sup>
Ergiloy 2.4816HN	2.4816	–	N06600	Inconel <sup>®</sup> Alloy 600 <sup>2)</sup>
Ergiloy 2.4819HX	2.4819	–	N10276	–
Ergiloy 2.4858HX	2.4858	–	N08825	Incoloy <sup>®</sup> Alloy 825 <sup>2)</sup>
Ergiloy 2.4856HS	2.4865	–	N06625	Inconel <sup>®</sup> 625 <sup>2)</sup>
<b>Titanium/titanium alloys</b>				
Ergitan <sup>7)</sup> 3.7025MP, MG	3.7025	–	R50250	Grade 1 (Grade 1 ELI)
Ergitan 3.7035MG	3.7035	–	R50400	Grade 2
Ergitan 3.7055MG	3.7055	–	R50550	Grade 3
Ergitan 3.7065MG, MT	3.7065	–	R50700	Grade 4
Ergitan 3.7165MG	3.7165	–	R56401, R56407	Grade 5; Grade 23, Ti6Al4V (ELI)
Ergitan 3.7195MG	~3.7195	–	R56320	Grade 9, ~Ti3Al2,5V
Ergitan 9.9150MG	–	AISI 244	R58150	Ti-15Mo
Ergitan 9.9367MG	–	–	R56700	TiAl6Nb7
<b>Cobalt base alloys</b>				
Ergiloy 9.9035HG	–	–	R30035	Co-Ni-Cr-Mo-Alloy, MP35N <sup>®2)</sup>
Ergiloy 9.9135HL, HN	–	–	R31537	CoCrMo Forging alloy; CoCr28Mo alloy 1
Ergiloy 9.9229HW	–	–	–	–
Ergiloy 9.9605XL	2.4964	–	R30605	L605 <sup>®3)</sup> , Haynes <sup>®25</sup> Alloy <sup>4)</sup>
Ergiloy 2.4964HL	2.4964	–	R30605	Co-Cr-W-Ni-Alloy; L605 <sup>®3)</sup> ; Haynes <sup>®</sup> 25 Alloy <sup>4)</sup>

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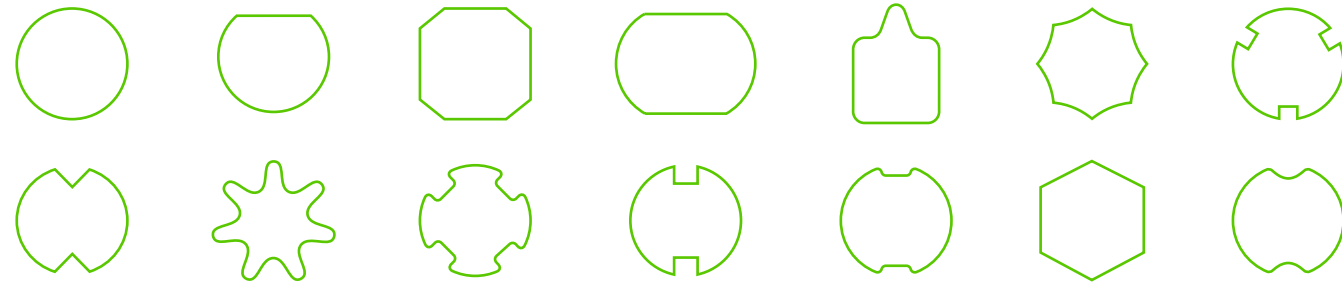
At a glance – our US colleagues and production site in Summerville.



# SOFT MAGNETIC STAINLESS STEELS

In the following you will get the most important information in regard of our soft magnetic stainless steels

If there are any questions left, please do not hesitate to contact us under Phone +49 2304 79-7169.



## Delivery forms and finishes

Product form/ finishes	Round bars	Profiles
Size range	0.236 - 1.339" (ø 6 - 34 mm) < 0.236" (6 mm) and > 1.339" (34 mm) on request	0.197 - 1.181" (5 - 30 mm) four-, six- and eight-edge for further profile geometry, see diagram other sizes and special shapes on request
Tolerances	according to DIN standard, ISO standard or accord to special specification	to special specification
Finish	drawn, annealed ground, polished crack detected acc. DIN ISO 10277 - class 1 to 4 US-tested on request unchecked ends removed on request	drawn to section, annealed crack detection acc. DIN ISO 10277 - Table 1 - class 1 on request - unchecked ends removed on request
Form of delivery	bars up to 13.78' (4,200 mm)	bars up to 9.84' (3,000 mm)
Bar end machining	chamfered/pointed/end-faced	chamfered/end-faced
Surface roughness	R <sub>max</sub> < 5 µm	R <sub>max</sub> < 10 µm

## Analysis of Solenoid stainless steels

Zapp brand names Europe	Comparable grades according to AISI/SAE	Abbreviation EN 10027-1	Analysis*							
			C	Si	Mn	P	S	Cr	Mo	Others
Ergste® 1.4003IA	-	X2CrNi12	< 0.03	< 1.00	< 1.50	< 0.040	0.015	10.5 - 12.5	-	Ni: 0.3 - 1.0
Ergste® 1.4005IA	~AISI 416	X2CrS13*	< 0.02*	< 1.00	< 1.50	< 0.040	0.25 - 0.35	12.0 - 14.0	< 0.60	-
Ergste® 9.9013IL	-	-	< 0.02	1.0 - 1.5	< 1.50	< 0.040	0.15 - 0.35	12.0 - 14.0	~ 0.4	-
Ergste® 1.4105IL	AISI 430FR	X6CrMoS17	< 0.03	1.0 - 1.5	< 0.80	< 0.030	0.25 - 0.35	17.25 - 18.0	0.20 - 0.50	Ni: < 0.6
Ergste® 1.4105IM	AISI 430F	X5CrMoS17	< 0.05	< 1.00	< 1.50	< 0.040	0.20 - 0.35	16.0 - 18.0	0.20 - 0.60	-
Ergste® 1.4016IM	AISI 430	X6Cr17	< 0.06	< 1.00	< 1.00	< 0.040	< 0.015	16.0 - 18.0	< 0.60	-
Ergste® 1.4113IM	AISI 434 Mod	X5CrMoS17-1*	< 0.03	< 1.80*	< 1.00	< 0.040	0.20 - 0.35*	17.0 - 18.5*	1.5 - 2.5*	-
Ergste® 1.4113IL	AISI 434	X5CrMoS17-1	< 0.05	< 1.00	< 1.50	< 0.040	< 0.03	16.0 - 18.0	0.90 - 1.40	-
Ergste® 1.4511IA	-	X3CrNb17	< 0.02	< 1.00	< 1.00	< 0.040	< 0.015	16.0 - 18.0	-	Nb: 0.2 - 0.5
Ergste® 1.4523IM	-	X2CrMoTiS18-2	< 0.03	< 0.5	< 0.5	< 0.040	~ 0.25	17.5 - 18.5	2.0 - 2.5	Ti: ≤ 0.8

\* deviation from ISO

## Magnetic and physical properties - round bars Ø 0.157 - 1.338" (4 - 34 mm)\*

Properties	Ergste® 1.0715	Ergste® 1.4003IA ~AISI 414	Ergste® 1.4005IA ~AISI 416	Ergste® 9.9013IL	Ergste® 1.4105IL AISI 430FR	Ergste® 1.4105IM AISI 430F	Ergste® 1.4016IM AISI 430	Ergste® 1.4113IM AISI 434 Mod	Ergste® 1.4113IL AISI 434	Ergste® 1.4511IA	Ergste® 1.4523IM
Saturation polarization J <sub>s</sub> [T]	> 0,2	> 1.70	> 1.70	~ 1.60	> 1.50	> 1.55	> 1.60	> 1.50	> 1.50	> 1.50	> 1.40
Remanance BR [T] max.	-	0.7 - 1.3	0.6 - 1.3	0.8 - 1.5	0.5 - 1.1	0.5 - 1.1	0.5 - 1.3	0.5 - 1.1	0.5 - 1.1	0.5 - 1.2	0.7 - 1.3
Permeability µ <sub>r max</sub>	> 1,200	> 1,700	> 1,700	> 2,000	> 1,500	> 1,200	> 1,500	> 1,500	> 1,300	> 2,000	> 1,500
Coercivity JHC [A/m]	< 300	< 180	< 180	< 150	< 200	< 260	< 200	< 200	< 240	< 160	< 240
Specific el. resistance ρ [µΩm]	-	> 0.55	> 0.63	> 0.60	> 0.79	> 0.62	> 0.53	> 0.82	> 0.64	> 0.56	> 0.60
Tensile strength [MPa]	300 - 550	350 - 550	350 - 550	350 - 550	350 - 550	350 - 550	350 - 550	400 - 600	400 - 600	350 - 550	430 - 630

\* 1.4523IM: 0.236 - 0.787" (ø 6 - 20 mm), other sizes and shapes on request

## Magnetic stainless steel for all applications





## CONTACT

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