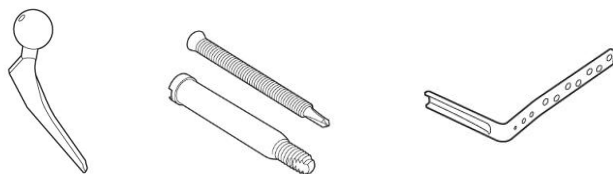


Austenitic Implant Materials Medical Alloys



Zapp is certified according to ISO 9001



Austenitic implant materials

The austenitic implant materials from Medical Alloys offer optimized properties in terms of corrosion resistance and biocompatibility, above all through remelting. They are characterized by high fatigue strengths and outstanding slag purity as well as microstructures that comply with standards. An exceptional level of biocompatibility is achieved by substituting nickel through manganese and nitrogen.

Typical application areas include short-term implants for traumatology and long-term implants used in endoprosthesis. The chemical compositions meet the requirements of local and international standards. We also use our works analyses to selectively tighten specifications for optimized properties.

Outstanding quality characteristics	raw material from qualified production sources
	high corrosion resistance
	biocompatibility
	amagnetic properties (MRI compatibility) *
	higher fatigue strength
	suitability as permanent implant through especially favorable combination of the properties listed above
Typical applications	bone screws, bone nails, bone plates
	joints replacement for hips, knees and shoulders
	coronary stents and minimally invasive instruments
	surgical wires and clamps
	intramedullary nails and fixation systems
Delivery forms / finishes	
Tolerances	ISO tolerance fields IT 11 - IT 5 for wire and bar
	according to DIN EN 9445 for precision strip
	special tolerances on request
Testing	surface quality through eddy current testing according to EN 10277-1 as well as testing for inner irregularities using ultrasound from Ø 6.0 mm possible (by agreement in case of appropriate product forms)

* MRI: Magnetic Resonance Imaging

** strip in Ergste® 1.444 1LA grade only

Wire	Ø 0.07 mm – 20.0 mm
	in coils, on spools
	polished, bright and flex-drawn specially coated
Bar	Ø 0.8 mm – 80.0 mm
	standard lengths 3,000 mm, special lengths on request
	drawn, annealed, ground, polished
	cut to length, chamfered, face chamfered, pointed, centered
	degreased, labeled
Profile	0.5 mm ² - 660.0 mm ² cross-section
	in bars, on spools
	rolled, specially rolled, drawn
	dull, bright, very bright
	“near net shape” standard shapes on stock
	½, ⅓ and ¼ tube
	special shapes on request
Precision strip / sheet	thicknesses 0.02 mm – 6.0 mm
	thicknesses 1.0 mm – 3.0 mm on stock
	widths 2.0 mm – 430.0 mm
	in coils and strips
	cold rolled, final annealed
	cut, deburred, rounded edges
Plate / tube	large rectangular profiles
	water jet trimmed blanks
	seamless tube < 20.0 mm on request

Austenitic implant materials

Ergste® 1.4441LA (UNS S31673)

Specific material properties	good slag purity, absence of foreign phases
	high tensile and fatigue strength
	can be polished to a high gloss
	elevated resistance to non-oxidizing acids and halogen-containing media
Typical analytical components (wt.%)	Cr: 18.0; Ni: 14.0; Mo: 2.5; Fe: bal.
Relevant standards	ISO 5832-1, ASTM F138, ASTM F139
Tensile strength	solution annealed > 490 MPa
	cold finished > 860 MPa
	extreme cold finished > 1350 MPa

Ergste® 9.9007CN (UNS S29225)

Specific material properties	highest strength and ductility in the solution annealed and cold hardened condition
	low-nickel (< 0.05 %) and pressure nitrided
	higher tensile strength versus Ergste® 1.4441LA and Ergste® 1.4472RN possible
Typical analytical components (wt.%)	Cr: 17.0; Ni: < 0.05; Mo: 2.5; Mn: 11.0; N: 0.5; Fe: bal.
Relevant standards	ASTM F2581
Tensile strength	solution annealed > 950 MPa
	cold finished > 1100 MPa
	extreme cold finished > 1350 MPa

Ergste® 1.4472RN (UNS S31675)

Specific material properties	good slag purity
	high tensile and fatigue strength
	elevated resistance to crevice corrosion
	higher tensile strength versus Ergste® 1.4441LA possible
Typical analytical components (wt.%)	Cr: 21.0; Ni: 10.0; Mo: 2.5; Mn: 3.0; N: 0.4; Fe: bal.
Relevant standards	ASTM F1586, ISO 5832-9, NF S94 - 090
Tensile strength	solution annealed > 850 MPa
	hardened > 1100 MPa
	extreme cold finished > 1350 MPa

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For further information about our products and locations, please refer to our image brochure or consult our website at www.zapp.com.

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