HIGH PERFORMANCE
ALLOYS

New since 1701
Zapp Precision Metals GmbH

zapp

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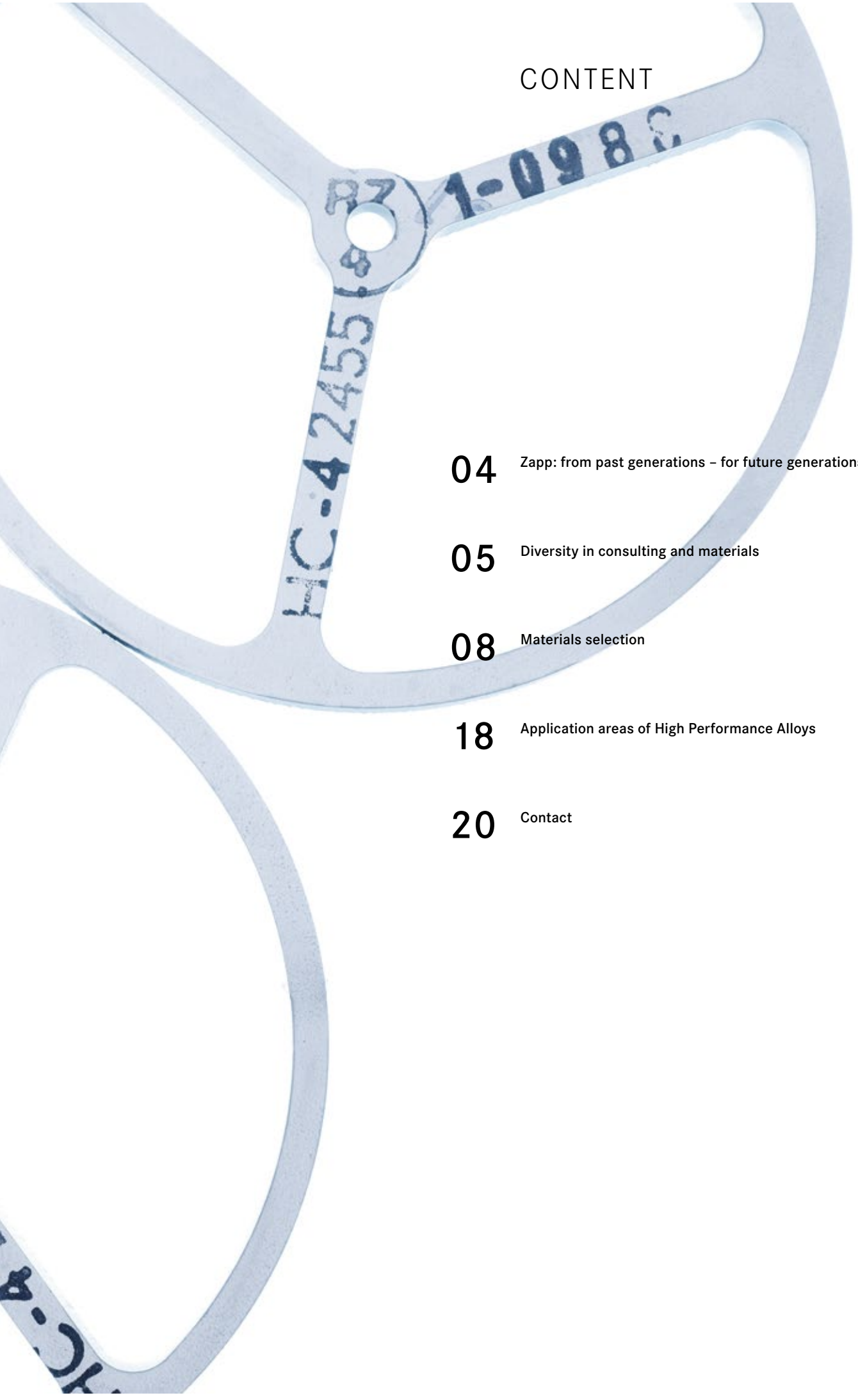
CONTENT



ZAPP: FROM PAST GENERATIONS – FOR FUTURE GENERATIONS

300 years of Zapp. In 1701 in Ründeroth, Germany, Hermann Zapp founded the company, which quickly became a specialist for high-grade, and high-performance steels. We deliver quickly and reliably thanks to a large network of selected sales partners and our own locations in Europe, Asia, and the US. With our experience and expertise, we ensure that you can turn your ideas into reality. From past generations – for future generations! We are your partner for your projects and can carry out the first manufacturing steps, such as cutting and straightening, prior to delivery. This allows you to fully concentrate on the core processes of your production. We supply the right product form for your specific needs: wire, bar, profile, tube, strip, dental discs, and more from stainless steel, titanium materials, nickel, and CoCr based alloys or metal powders. The quest for innovation, intensive quality assurance and the willingness to solve complicated technical problems are our driving forces.

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

DIVERSITY IN CONSULTING AND MATERIALS

Zapp Precision Metals GmbH ensures decision reliability when it comes to your materials and supply reliability in your production. Because timeliness is essential for you it is a matter of course for us.

Benefit from more than 60 years of experience in the field of special materials such as nickel, cobalt, and titanium.

More than 1,200 tons of material in 30 types and almost all semi-finished forms are available through our worldwide service centers. These include, in particular, strips, sheets, wires, bars, tubes, forgings, and welding consumables. Various processing options such as sawing, water jet systems, and much more complete our service for you.

Fast, competent, versatile

Many of our materials are used in industries with the highest technical requirements on materials, such as the oil and gas industry, the aerospace industry, the automotive industry, and the pharmaceutical or chemical process industries.

Ultimately, however, our technical advice, detailed application knowledge, and cooperation make us an exclusive partner of renowned manufacturers such as Haynes International, Inc., U.S.A.

We are happy to advise you, and look forward to your questions and the subsequent dialogue with you!

»I support you with my knowledge.«

»Our materials made from special alloys are very complex and require some explanation in terms of use under aggressive conditions and also at high temperatures. With my 30 years of experience, I am happy to support you. By now, I've gotten to know many different customer requirements, and I am sure I will provide you with the right advice in choosing the optimal material.«

Reinhart Baden, Technical Consultant
High Performance Alloys
Ratingen Location

MATERIALS SELECTION*

Nickel base alloys	Density g/cm³	Specification, brief description (weight %)	Material no.	VdTÜV	DIN	UNS	SAE AMS
HASTELLOY® B-3® alloy	9.22	NiMo29Cr	2.4600	517	17744[1)], 17750[2)], 17751[3)], 17752[4)]	N10675	–
HASTELLOY® HYBRID-BC1® alloy	8.83	NiMo22Cr15	2.4708	–	–	N10362	–
HASTELLOY® C-4 alloy	8.64	NiMo16Cr16Ti	2.4610	424	17744[1)], 17750[2)], 17751[3)], 17752[4)]	N06455	–
HASTELLOY® C-22® alloy	8.69	NiCr21Mo14W	2.4602	479	17744[1)], 17750[2)], 17751[3)], 17752[4)]	N06022	–
HASTELLOY® C-22HS® alloy	8.60	56Ni-21Cr-17Mo**	–	–	–	N07022	–
HASTELLOY® C-276 alloy	8.89	NiMo16Cr15W	2.4819	400	17744[1)], 17750[2)], 17751[3)], 17752[4)]	N10276	–
HASTELLOY® C-2000® alloy	8.50	NiCr23Mo16Cu	2.4675	539	17744[1)], 17750[2)], 17751[3)], 17752[4)]	N06200	–
HASTELLOY® G-35® alloy	8.22	NiCr33Mo8	2.4643	–	–	N06035	–
HAYNES® 214® alloy	8.05	NiCr16Al	2.4646	–	–	N07214	–
HAYNES® HR-224® alloy	7.72	47Ni-27Fe-20Cr-3.8Al**	–	–	–	–	–
HAYNES® 230® alloy	8.97	NiCr22W14Mo	2.4733	–	17744[1)], 17750[2)], 17751[3)], 17752[4)]	N06230	5878[1)2)], 5891[1)4)6)]
HAYNES® 242® alloy	9.05	65Ni-25Mo-8Cr**	–	–	–	N10242	–
HAYNES® 282® alloy	8.30	57Ni-20Cr-10Co-8.5Mo**	–	–	–	N07208	5951[2)]
HAYNES® HR-160® alloy	8.08	NiCo29Cr28Si	2.4880	–	–	N12160	–

* Depending on the manufacturer, product trademarks may vary from those given here.
** The alloy is not specified in DIN.

ASTM	Description	Application
B 333[1)2)], B 335[1)4)], B 622[1)3)], B 619[1)3)], B 626[1)3)], B 366[1)7)], B 564[1)6)], B462[1)7)], B 472[1)8)]	Nickel-molybdenum alloy, highly resistant to corrosion. HASTELLOY® B-3® alloy has a lower tendency to precipitations than HASTELLOY® B-2 alloy. An improved corrosion resistance is achieved, especially in the heat affected zone.	Components which are exposed to severe chemical conditions, in particular in reducing media, e.g., hydrochloric acid in all concentrations up to the boiling point. Chemical engineering, centrifuges, heat exchangers.
B 366[1)7)], B 462[1)7)], B 472[1)8)], B 564[1)6)], B 619[1)3)], B 626[1)3)], B 574[1)4)], B 575[1)2)]	Corrosion resistant nickel-molybdenum-chromium alloy with very good resistance to hydrochloric acid, sulfuric acid, pitting and crevice corrosion.	In the chemical processing, pharmaceutical, agricultural, food, petrochemical, and power industries: Reaction vessels, valves, pumps, piping, storage tanks
B 575[1)2)], B 574[1)4)], B 622[1)3)], B 619[1)3)], B 626[1)3)], B 366[1)7)]	Nickel-chromium-molybdenum alloy, highly resistant to corrosion, with outstanding stability at elevated temperatures.	Components which are exposed to oxidizing media with chloride content, e.g., contaminated oxidizing acids in exhaust gas cleaning systems.
B 575[1)2)], B 574[1)4)], B 622[1)3)], B 619[1)3)], B 626[1)3)], B 366[1)7)], B 564[1)6)], B 462[1)7)], B 472[1)8)]	Nickel-chromium-molybdenum-tungsten alloy, resistant to corrosion, with high resistance to aggressive, oxidizing and reducing media – even at elevated temperatures.	Power engineering, chemical industry, e.g., for acetic and formic acid production, chloric gas and phosphoric acid applications
B 637[4)6)] B 983[3)]	An age hardenable corrosion-resistant, nickel-chromium-molybdenum alloy which can obtain a strength approximately double that of other C-type alloys after heat treatment. The alloy is high resistance to chloride-induced pitting and crevice corrosion attack.	Agitators and blenders, shafting, fan blades and hubs, fasteners, springs, valves, dies, screws, wellhead parts, rings and gaskets
B 575[1)2)], B 574[1)4)], B 622[1)3)], B 619[1)3)], B 626[1)3)], B 366[1)7)], B 564[1)6)], B 462[1)7)], B 472[1)8)]	Nickel-chromium-molybdenum-tungsten alloy, highly resistant to corrosion with good resistance to pitting corrosion in reducing and oxidizing media.	In oxidizing media containing chlorides and fluorides, e.g., exhaust gas cleaning systems, for use with formic and acetic acids, in melamine and ammonia facilities.
B 575[1)2)], B 574[1)4)], B 622[1)3)], B 619[1)3)], B 626[1)3)], B 163[1)3)], B 366[1)7)], B 564[1)6)], B462[1)7)], B472[1)8)]	Outstanding versatile nickel-chromium-molybdenum-copper alloy, also high resistance to hot concentrated sulphuric acids. Good resistance to pitting corrosion. Excellent thermal structure stability.	Chemical process technology, wherever a wide range of corrosion resistance (reducing/oxidizing) is required, as well as chloric conditions.
B 575[1)2)], B 574[1)4)], B 622[1)3)], B 619[1)3)], B 626[1)3)], B 366[1)7)], B 564[1)6)], B 462[1)7)]	Ni-Cr-Mo alloy with increased chromium content. Excellent corrosion resistance in oxidizing media. HASTELLOY® G-35® alloy exhibits numerous improvements compared to HASTELLOY® G-30® alloy.	Phosphoric acid, specific cases of high temperature corrosion to approximately 760°C, oxidizing acid media
–	Nickel-based super alloy with outstanding oxidation resistance up to 1,260°C. Excellent resistance to carburization and chlorine-bearing environments, especially at high temperatures.	In demanding industrial heating applications, flue gas cleaning plants, incinerating facilities, chemical industry, automotive industry
–	A nickel based alloy with controlled aluminium content. This alloy achieves superior oxidation resistance through the formation of a tightly adherent alumina protective scale and shows excellent oxidation resistance, improved fabricability and weldability.	Heat recuperators, automotive catalytic converters and heat shields, strand annealing furnace tubulars, and other severely oxidizing environments
B 435[1)2)], B 572[1)4)], B 622[1)3)], B 619[1)3)], B 366[1)7)], B 564[1)6)]	Solid solution strengthened nickel based alloy with an excellent combination of favorable characteristics: thermal stability, oxidation resistance up to 1,150°C resistant to nitriding, carburization, damp conditions.	Semi-finished products for gas turbine engineering, furnace engineering, chemical plant, technology and apparatus engineering, petrochemical plants, incineration with thermal cycling characteristics
B 434[1)2)], B 573[1)4)], B 622[1)3)], B 619[1)3)], B 626[1)3)], B 366[1)7)], B 564[1)6)]	Age-hardenable nickel-molybdenum-chromium alloy with excellent strength up to 705°C and low thermal expansion characteristics, good oxidation resistance up to 815°C. Excellent resistance to high temperature fluorine and fluoride-bearing environments. High strength combined with excellent corrosion resistance and advanced wear resistance.	Used in gas turbine engineering, fluoropolymer plastics production and CPI applications.
B 637[4)6)]	A gamma-prime strengthened superalloy developed for high temperature structural applications. It combines creep strength, thermal stability, weldability, and fabricability. The alloy has excellent creep strength in the temperature range of 650 to 930°C.	Automotive disc springs, exhaust and nozzle components, transition sections and other hot-gas-path components
B 435[1)2)], B 572[1)4)], B 622[1)3)], B 619[1)3)], B 626[1)3)], B 366[1)7)], B 564[1)6)]	Solid solution strengthened nickel-cobalt-chromium- silicon alloy. Outstanding resistance to sulfidation and other high temperature aggressive environments such as chloride attacks in reducing and oxidizing environments. Excellent resistance to oxidation, hot gas corrosion, carburizing and metal dusting as well as nitridation and others. Temperatures up to 1,205°C.	Alternating and/or aggressive service conditions. Used in waste incineration, boiler, high temperature reaction vessel. For furnace engineering and thermal ore dressing and other applications.

[1)] Chemical composition, [2)] Sheets and strips, [3)] Tubes and pipes, [4)] Bars/rods, [5)] Wires, [6)] Forgings,
[7)] Tube and pipe accessories, [8)] Billets, [a)] SEW data sheet
® is a registered trademark of our contracted manufacturer HAYNES International, Inc., Kokomo, Indiana, U.S.A.

MATERIALS SELECTION*

Nickel base alloys	Density g/cm³	Specification, brief description (weight %)	Material no.	VdTÜV	DIN	UNS	SAE AMS
Alloy 201	8.89	LC-Ni99	2.4068	345	17740[1], 17750[2], 17751[3], 17752[4], 17753[5]	N02201	–
Alloy 400	8.83	NiCu30Fe	2.4360	263	17743[1], 17750[2], 17751[3], 17752[4], 17753[5], 17754[6]	N04400	–
Alloy K-500	8.50	NiCu30Al	2.4375	–	17743[4],17752[4], 17754[6]	N05500	–
Alloy 600	8.47	NiCr15Fe	2.4816	305	17742[1], 17750[2], 17751[3], 17752[4], 17753[5], 17754[6], EN 10095[1)2)4)5)]	N06600	–
Alloy 601	8.11	NiCr23Fe	2.4851	–	17742[1], 17750[2], 17751[3], 17752[4], 17753[5], 17754[6], EN 10095[1)2)4)5)]	N06601	–
Alloy 625	8.44	NiCr22Mo9Nb	2.4856	499	17744[1], 17750[2], 17751[3], 17752[4], 17753[5], 17754[6], EN 10095[1)2)4)5)]	N06625	5599[1)2)], 5666[1)4)6)], 5581[1)3)], 5837[1)5)]
Alloy 718	8.23	NiCr19Fe19Nb5Mo3	2.4668	–	17744[1)]	N07718	5596[1)2)], 5597[1)2)], 5662[1)4)6)8)], 5664[1)4)6)8)], 5663[1)4)6)8)]
Alloy 825	8.14	NiCr21Mo	2.4858	432	17744[1], 17750[2], 17751[3], 17752[4], 17753[5], 17754[6]	N08825	–
Iron base alloys							
HAYNES® HR-120® alloy	8.07	NiFe33Cr25Co	2.4854	–	–	N08120	5916[1)2)]
HAYNES® 556® alloy	8.23	X10CrNiCoMoN 22-20-18	1.4883	–	–	R30556	5831[1)5)], 5877[1)4)], 5874[1)2)]
Alloy 800H	7.95	X10NiCrAlTi32-20	1.4876	434	SEW 470[a], EN 10095[4)]	N08810	–

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ASTM	Description	Application
B 160[1)4)], B 161[1)3)], B 162[1)2)], B 163[1)3)], B 366[1)7)], B 564[1)6)], B 725[1)3)], B 730[1)3)], B 751[1)3)], B 775[1)3)], B 829[1)3)]	Commercial pure nickel, good thermal, electrical and magnetostrictive properties. Excellent corrosion resistance primarily in caustic alkalines at elevated temperatures.	Food processing, manufacturing of plastics and alkaline substances, chemical processes where a high degree of purity is demanded. Production of cold formed components
B 127[1)2)], B 164[1)4)5)], B 564[1)6)], B 163[1)3)], B 165[1)3)], B 725[1)3)], B 730[1)3)], B 751[1)3)], B 775[1)3)], B 829[1)3)], B 366[1)7)]	Nickel-copper alloy: good tensile strength and toughness, high resistance to seawater, sulphuric, hydrochloric, hydrofluoric and phosphoric acids.	Valves, pumps, centrifuges and heat exchangers, pipework subjected to seawater
B 825[4)5)6)]	An age hardenable nickel-copper-aluminium alloy which combines corrosion resistance with high strength and hardness. Exhibits a good resistance against sour gas and chloride induced stress-corrosion cracking e.g. see water.	Pumps, valves and pipe systems especially in oil and gas industry
B 166[1)4)5)], B 564[1)6)], B 168[1)2)], B 906[1)2)], B 163[1)3)], B 167[1)3)], B 516[1)3)], B 517[1)3)], B 751[1)3)], B 775[1)3)], B 829[1)3)], B 366[1)7)]	Nickel-chromium-iron alloy: good oxidation resistance up to 1,050 °C, excellent resistance to stress corrosion cracking due to high nickel content.	Furnaces and other thermal treatment facilities, protective tubes for heating elements in nuclear energy technology, CPI applications
B 166[1)4)5)], B 167[1)3)], B 751[1)3)], B 775[1)3)], B 829[1)3)], B 168[1)2)]	Nickel-chromium-iron alloy with aluminum content, excellent resistance in aggressive gases in oxidizing atmospheres up to 1,150 °C.	Heat treatment facilities, e.g., furnace rolls, suspension elements, glow plugs for diesel engines
B 443[1)2)], B 444[1)3)], B 704[1)3)], B 705[1)3)], B 564[1)6)], B 366[1)7)], B 446[1)4)]	Corrosion-resistant nickel-chromium-molybdenum alloy with high mechanical properties – also at elevated temperatures. Good corrosion resistance in oxidizing and chloride containing media.	Components for nitric acid plants, exhaust gas cleaning systems, components used in seawater, membranes
B 637[1)4)8)]	Age-hardenable nickel-chromium-iron alloy: high creep strength up to 700 °C. Specific properties can be achieved by the use of controlled heat treatment parameters.	Aircraft-, automotive- and gas turbine components, spring production. Components which are subjected to severe mechanical requirements under elevated temperatures or corrosive conditions.
B 163[1)3)], B 423[1)3)], B 704[1)3)], B 705[1)3)], B 751[1)3)], B 775[1)3)], B 829[1)3)], B 424[1)2)], B 906[1)2)], B 564[1)6)], B 425[4)], B 366[1)7)]	Corrosion resistant nickel-iron-chromium alloy with good resistance to hot oxidizing and reducing acids.	Heat exchangers subjected to water with chloride content and other plant components which are subjected to sulphuric and phosphoric acid compounds.
B 163[1)3)], B 366[1)7)], B 407[1)3)], B 514[1)3)], B 515[1)3)], B 409[1)2)], B 564[1)6)], B 408[1)4)]	Solid solution strengthened iron-nickel-chromium alloy, with high resistance to oxidation up to 1,100 °C, sulphurizing and/or carburizing together with excellent creep strength.	Retorts, muffles, baskets, fastening elements for heat treatment furnaces, waste incinerators, petrochemical facilities, power generating plants
B 435[1)2)], B 572[1)4)], B 619[1)3)], B 622[1)3)], B 626[1)3)]	Solid solution strengthened iron-based superalloy; high thermal structure stability, resistance to severely corrosive gaseous substances at low and high temperatures up to 1,100 °C. Favorable fabricability, creep strength, resistance to sulphur and carbon for high temperature applications.	Waste incinerator facilities, industrial furnaces, chemical and petrochemical processing technology. Excellent weldability, therefore suitable for welding or dissimilar high temperature alloys, suitable for salt- and zinc melts.
B 163[1)3)], B 366[1)7)], B 407[1)3)], B 514[1)3)], B 515[1)3)], B 409[1)2)], B 564[1)6)], B 408[1)4)]	Iron-nickel-chromium-alloy with very good resistance to carburizing and changing oxidizing/reducing atmosphere. Optimized creep properties due to controlled alloying elements carbon, silicium, aluminum and titanium, which make applications above 600 °C possible.	Heat exchangers, heat treatment facilities, heaters, fans, housing, chemical and petrochemical plants (reforming plants and fluidizing furnaces)

[1)] Chemical composition, [2)] Sheets and strips, [3)] Tubes and pipes, [4)] Bars/rods, [5)] Wires, [6)] Forgings,
[7)] Tube and pipe accessories, [8)] Billets, [a)] SEW data sheet
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MATERIALS SELECTION*

Cobalt base alloys	Density g/cm³	Specification, brief description (weight %)	Material no.	VdTÜV	DIN	UNS	SAE AMS
ULTIMET® alloy	8.48	CoCr26Ni9MoW	2.4681	–	–	R31233	–
Alloy 6-B	8.39	60Co-28Cr-4.5W-1.15C**	–	–	–	R30016	5894[1)2)]
HAYNES® 25 alloy	9.14	CoCr20W15Ni	2.4964(WL)	–	–	R30605	5537[1)2)], 5759[1)4)6)], 5796[1)4)5)]
HAYNES® 188 alloy	8.98	CoCr22NiW	2.4683	–	–	R30188	5608[1)2)], 5772[1)4)6)], 5801[1)5)]
Reactive/refractory metals							
Titanium Grade 1 Titanium Grade 2	4.51 4.51	Ti1 Ti2	3.7025 3.7035	230 230	17850[1)], 17860[2)], 17861[3)], 17862[4)], 17863[5)], 17864[6)], 17866[5)]	R50250 R50400	–
Titanium Grade 5	4.42	TiAl6V4 TiAl6V4(WL)	3.7165 3.7164	–	17851[1)], 17860[2)], 17862[4)], 17864[6)]	R56400	4911[1)2)], 4928[1)4)5)6)]
Zirconium 702	6.49	–	–	–	–	R60702	–

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** The alloy is not specified in DIN.

ASTM	Description	Application
B 818[1)2)], B 815[1)4)]	Outstanding wear-resistant cobalt-chromium-nickel alloy: excellent resistance in oxidizing and good resistance under reducing corrosive conditions, also at elevated temperatures, coupled with exceptional wear resistance (cavitations, erosion, galling and abrasion).	Conveyors, conditioning technology, plant components which encounter aggressive media and simultaneous wear, e.g., nozzles, agitators, pumps, mixers, cylinders and boring mills
–	Alloy 6-B alloy belongs to the family of high wear-resistant cobalt-based alloys with excellent properties to withstand wear by abrasion, erosion, cavitations and impingement also at high temperatures.	Bearing shells, baffle plates, sealing technics, the knife and blade industry, mineral processing plant, centrifuges, ammunition disposal, minerals handling technology, roting components for liquid and gaseous media
–	Solid solution strengthened cobalt-based alloy: excellent creep strength properties, oxidation resistance up to 980 °C and resistance to gaseous sulphur containing media.	Aviation gas turbine technology, bearing technics, rocket propulsion parts, rocketry, industrial incinerator plant, fiberglass manufacture
–	Solid solution strengthened cobalt-based superalloy: high oxidation resistance up to 1,100 °C, high creep strength, extremely high resistance to hot gas corrosion.	Aviation gas turbine technology, bearing technics, rocket propulsion parts, rocketry, industrial incinerator plant, fiberglass manufacture
B 265[1)2)], B 338[1)3)], B 348[1)4)], B 363[1)7)], B 381[1)6)], B 861[1)3)], B 862[1)3)], B 863[1)5)]	Commercial pure titanium: the low iron content supports the excellent corrosion resistance in wet chloride containing, oxidizing media. Titanium shows an outstanding biocompatibility. A slight modification of the trace elements increases the mechanical properties.	Structural parts which are subject to severe oxidizing stresses, particularly in combination with chlorides: the chemical industry, desalinization facilities for seawater, power station technology, medical technology, lightweight contruction technology
B 265[1)2)], B 348[1)4)], B 381[1)6)], B 863[1)5)]	Titanium α+β alloy: Outstanding specific strength. The mechanical properties can be influenced by heat treatment to controlled parameters. A higher specification level is available for aircraft applications (WL-Grade). A slight modification of the composition results in improved formability (ELI-Grade).	Structural aircraft components, CPI, rotation components, fastening elements, automotive technology, sonotrodes and medical engineering
B 493[1)6)], B 550[1)4)], B 653[1)7)], B 523[1)3)], B 551[1)2)], B 658[1)3)]	Refractory alloy with high corrosion resistance, high strength and good working properties, resistant to aggressive, oxidizing and reducing media.	Tanks, pumps, mounting parts, tubes and fittings for the manufacture of acetic acid according to the Monsanto method, in hydrochloric, nitric and sulphuric acids. Chemical processing technology

[1)] Chemical composition, [2)] Sheets and strips, [3)] Tubes and pipes, [4)] Bars/rods, [5)] Wires, [6)] Forgings,
[7)] Tube and pipe accessories, [8)] Billets, [a)] SEW data sheet
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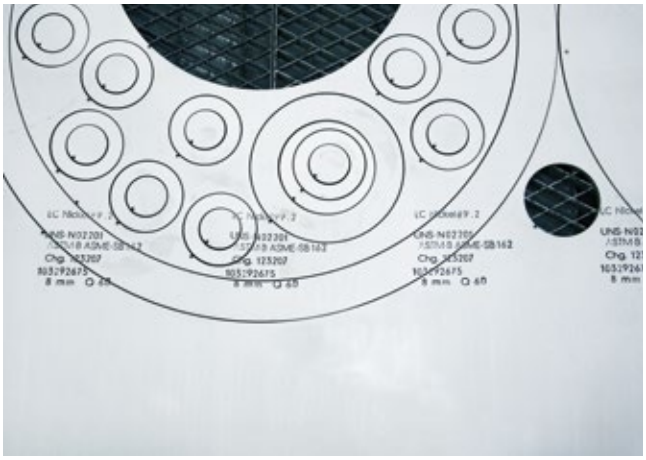


»Satisfaction is a top priority.«

»As the coordinator of the service center, I am the »interface« between incoming goods and the processing of our high-quality steels by sawing and cutting. My job is all about communication, be it with the colleagues on site, like here with Niklas Unkhoff, with the suppliers of our high-quality special steels, or with our customers because they are waiting for the ordered goods. The Service Center team takes care of safe, fast, and proper delivery. I work every day to ensure that everyone involved is satisfied, and I still enjoy dealing with many people even after more than 15 years.«

Panagiotis Georgopoulos, Manager Service Center
High Performance Alloys
Unna location

»I take care of smooth processes.«

»Shortly after I completed my training, Zapp received an urgent request from a shipping company. It was about the repair of a hydraulic control line on a cruise ship in onboard operation in order to avoid risking time or high costs by coming in to a repair dock.

With this requirement, Zapp's order processing process, which is often still impressive for me, set in motion. Inventories were checked, material cut and packaged, customs formalities completed, and material transported by air. After five days, our much-needed material arrived at a picturesque pier in Curacao to be brought aboard and installed unnoticed on a luxury liner, ensuring trouble-free travel. These or similar customer requirements have always been a motivation for me to ensure smooth order fulfillment, especially in a more complex and fast-paced environment.

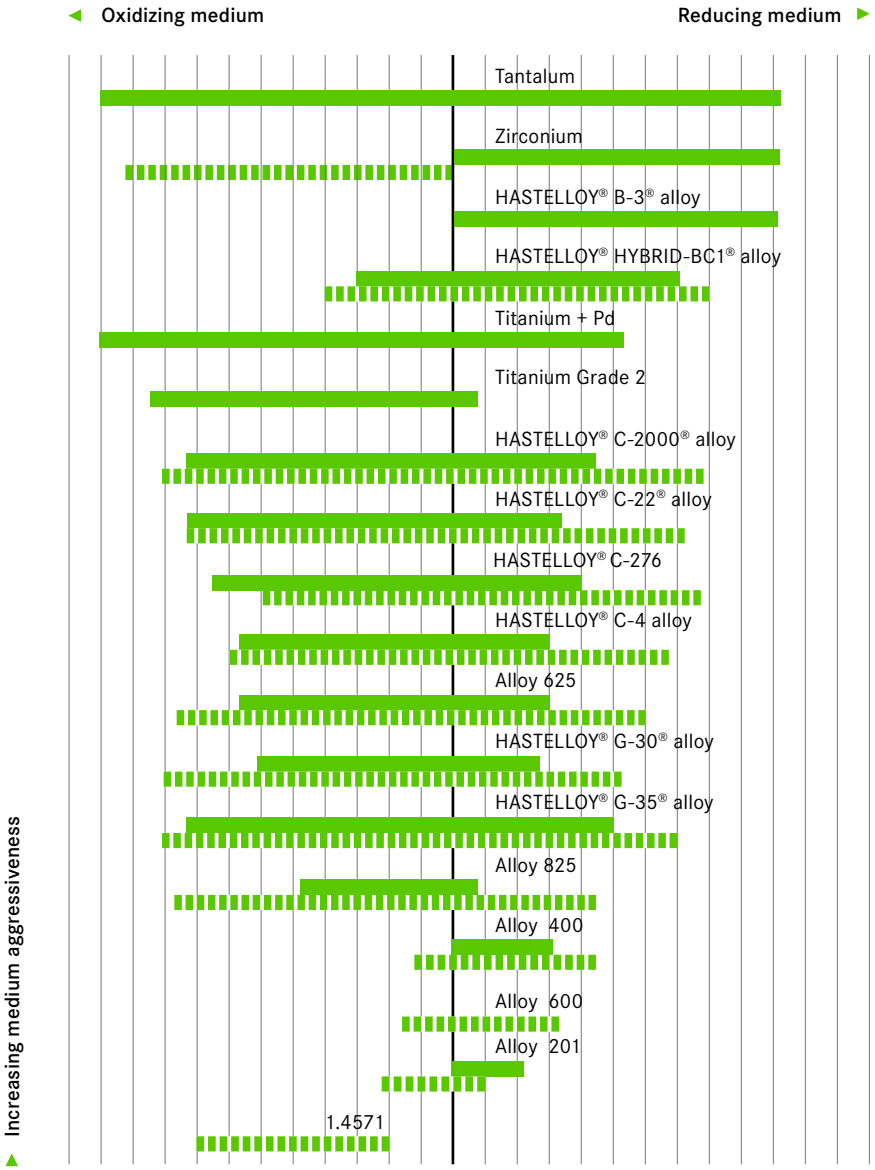
In my more than 32 years' tenure, I have always had the opportunity to perform a variety of activities, be it as a sales representative, an assistant to management, through team assistance, or in cooperation with our marketing team. This has allowed me to get to know the diversity of the Zapp cosmos from close proximity. Particularly important was and is the cooperation with this effective, highly specialized, and competent Zapp network with the most modern structures – such as our recently built service center in Unna.

The ever-new challenges and their successful mastering are still a top priority for me. As part of the Zapp team, I am sure that we will always find the right solution and ensure optimal customer results.«

Stefanie Chmill, Inside Sales
Ratingen Location

APPLICATION AREAS OF HIGH PERFORMANCE ALLOYS

High performance alloys under aqueous conditions

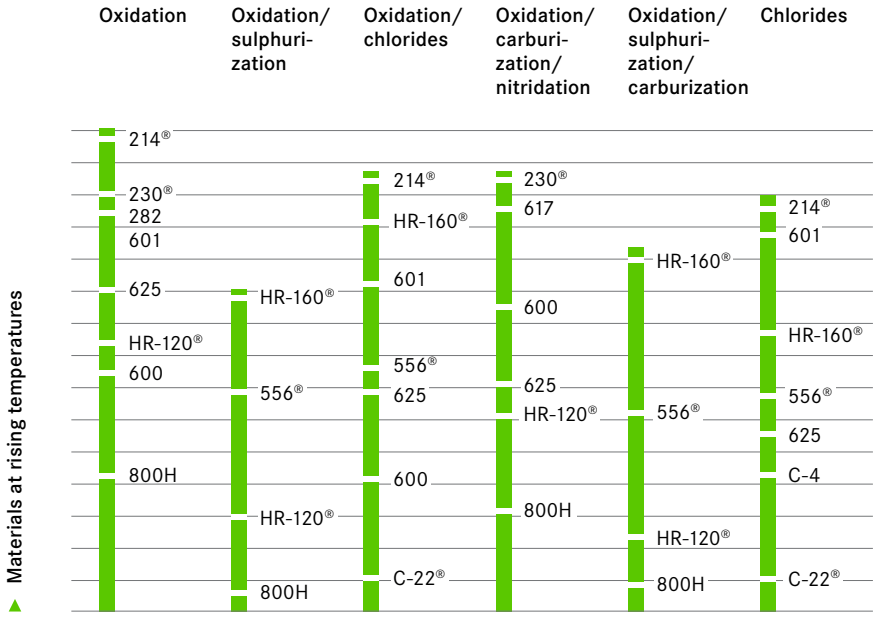


The graphic depicts examples of the greater or lesser resistance to corrosion of certain materials in oxidizing and reducing media. In general, there are many differing conditions of use and, in parallel with these, a number of high performance materials with ever shortening development times. We are here to advise you on a suitable material for your specific application.

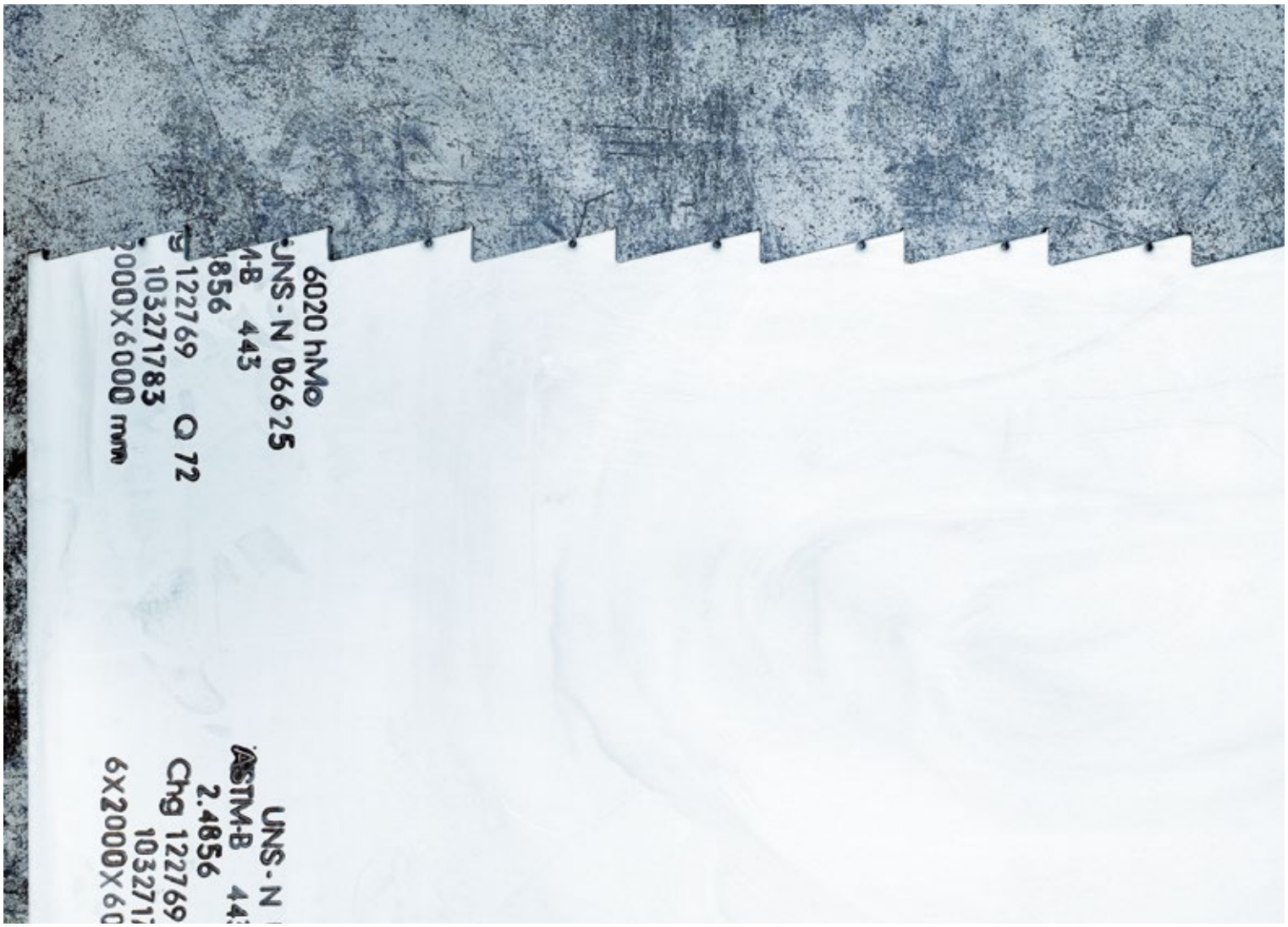
Chloride-containing medium

Chloride-free medium

High performance alloys under elevated temperature conditions



This chart evaluates the properties at elevated temperatures. A review of mechanical properties would result in different conclusions. These charts can only provide an overview. Therefore we are pleased to advice you on the right selection of materials.



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