Höverstahl – Aerospace

Höver Aeralloy special materials and special steels for airframes and engines in the aerospace business.

We are your partners – from development up to series production. With selected materials and creative forging technology for the direct route from concept to finished product.

We assist you in the selection of materials with first-class Höverstahl Aeralloy special alloys and special steels, from ultrapure refined heats, precisely formed and heat treated, with optimised properties for highest strength and excellent corrosion resistance.

Höverstahl is co-responsible partner in the manufacture of important aerospace systems.

The name Höverstahl stands for continuous safety and reliability in the Ariane satellite launching system, the Airbus and sophisticated military equipment.

We manufacture to

- Drawings (premachined and final machined condition)
- Supply regulations
- Codes and standards

as

- open-die forgings
- Seamless forged and rolled rings
- Forged discs
- Shaped, upset shafts or bars

from

- Highly refined heats of special steels
- Stainless steels
- Titanium and titanium alloys
- Cobalt alloys
- Zirconium

e.g.

- With special heat treatment
- Fully tested and certified.

Special Steels

Material	No.	Alloy type	Trade designation*
Special steels for aerospace and specialised technologies			
Aeralloy 440	1.3544	X 102 CrMo 17	AISI-440-C
Aeralloy 431-C	1.4044	X 16 CrNi 17.2	AISI-431-C
Aeralloy PH 13-8 Mo	1.4534	X 3 CrNiMoAl 13.8.2	PH 13-8 Mo
Aeralloy 321	1.4544	X 7 CrNiTi 18.9	AISI-321
Aeralloy 15-5 PH	1.4545	X 5 CrNiCuNb15.5.4	15-5 PH
Aeralloy 347	1.4546	X 5 CrNiNb 18.10	AISI-347
Aeralloy 17-4 PH	1.4548	X 5 CrNiCuNb17.4.4	17-4 PH
Aeralloy 17-7 PH	1.4564	X 7 CrNiAl 17.7	17-7 PH
Aeralloy 15-7 Mo PH	1.4574	X 7 CrNiMoAl 15.7	15-7 Mo PH
Aeralloy AM-355	–	(15Cr-4Ni-3Mo)	AM 355
Aeralloy C-455	–	(12Cr-9Ni-2Cu)	Custom 455
Aeralloy Greek Ascoloy	–	(13Cr-3W-2Ni)	Greek Ascoloy (AISI 418)
Aeralloy 4934	1.4934	X 20 CrMoWV 12.1	–
Aeralloy M152	1.4939	X 12 CrNiMo 12	Jethete M 152
Aeralloy A 286	1.4943	X 4 NiCrTi 25.15	A 286
	1.4944	X 5 NiCrTi 26.15	A 286
Aeralloy V 57	–	X 8 NiCrTi 27.15	V 57
Aeralloy N155	1.4974	X 12 CrCoNi 21.20	N 155
Aeralloy MAR-300	1.6354	X 2 NiCoMo 18.9.5	Maraging 300
	1.6358	X 2 NiCoMo 18.9.5	
Aeralloy MAR-350	1.6356	X 2 NiCoMoTi 18.12.4	Maraging 350
Aeralloy MAR-250	1.6359	X 2 NiCoMo 18.8.5	Maraging 250
Aeralloy 6604	1.6604	30 CrNiMo 8	–
Aeralloy 6944	1.6944	38 NiCrMoV 7.3	–
Aeralloy S 5000	–	~40NiCrMo 6	SAE 4340
Aeralloy 300 M (4340 mod.)	~1.6928	~41SiNiCrMoV 7.6	300 M
Aeralloy HY-TUF	–	(.27C-1.5Si-1.5Mn-.4Cr-.45Mo--1.9Ni-.1V-.1Cu)	HY-TUF
Aeralloy D 6 AC	–	~48 CrMoNiV 4.10	D 6 AC
Aeralloy HP-9-4-20	–	(9Ni-4.5Co-1Mo)	HP-9-4-20
Aeralloy HP-9-4-30	1.6974	(7.5Ni-4.5Cu-1Mo)	HP-9-4-30
Aeralloy 7734	1.7734	14 CrMoV 6.9	15 CDV 6
Aeralloy 7736	1.7736	ESU-14 CrMoV 6.9	–
Aeralloy H 11	1.7784	X 41 CrMoV 5.1	H 11
Special steels with defined coefficients of thermal expansion for ultra-high precision components in aerospace, research, instrumentation, lasers			
Coralloy ALPHA 36	1.3912	Ni 36	INVAR 36
Coralloy ALPHA 42	1.3917	Ni 42	INVAR 42

Nickel and cobalt materials

Material	No.	Alloy type	Standard designation *	Application
Aeralloy 41 Precipitation hardenable high-temperature and corrosion resistant nickel-based alloy	(2.4973)	NiCr 19 CoMo	Rene 41	Gas turbines
Aeralloy 75 High-temperature and corrosion resistant nickel-based alloy	2.4630 (2.4951)	NiCr 20 Ti	Nimonic 75	Industrial furnaces, gas turbines, nuclear industry

Nickel and cobalt materials

Material	No.	Alloy type	Standard designation *	Application
Aeralloy 80 A Precipitation hardenable high-temperature and corrosion resistant nickel-based alloy	2.4631 (2.4952)	NiCr 20 TiAl	Nimonic 80 A	Gas turbínes
Aeralloy 81 Modification of Aeralloy 80A with increased chromium content	–	NiCr 30 TiAl	Nimonic 81	Gas turbines
Aeralloy 90 Precipitation hardenable high-temperature and corrosion resistant nickel-based alloy	2.4632 (2.4969)	NiCr 20 Co 18 TiAl	Nimonic 90	Gas turbines, high-temperature springs
Aeralloy 91 Modification of Aeralloy 90 with increased chromium content	–	NiCr 29 Co 20 TiAl	Nimonic 91	Gas turbines
Aeralloy 101 Modification of Aeralloy 105 with increased chromium content	–	NiCr 25 Co 20 TiMo IN 597	Nimonic 101	Gas turbines (burner zone)
Aeralloy 105 Precipitation hardenable high-temperature alloy on Ni-Co-Cr basis	2.4634	NiCo 20 Cr 15 MoAlTi	Nimonic 105	Gas turbines, springs
Aeralloy 188 Heat resistant cobalt-based alloy	– (2.4683)	CoCr 20 NiW	HS 188	Gas turbines
Aeralloy C-263 Precipitation hardenable high-temperature alloy on Ni-Co-Cr basis	2.4650	NiCo 20 Cr 20 MoTi	Nimonic C-263	Gas turbines, high-temperature furnaces
Aeralloy A-286 Precipitation hardenable high-performance special steel, high temperature and corrosion resistant	1.4944 1.4943 (1.4980)	X 5 NiCrTi 26.15 X 4 NiCrTi 25.15	A-286	Gas turbines
Aeralloy 500 Austenitic Ni-Cr-Co alloy, precipitation hardenable	2.4983	NiCr 18 Co	Udimet 500	Turbine blades and rings
Aeralloy 520 Precipitation hardenable Ni-Cr-Co alloy, high-temperature and corrosion resistant	–	NiCr 19 Co 12 MoTiAlW	Udimet 520	Gas turbines, stationary
Aeralloy L-605 Heat resistant cobalt-based alloy	2.4964 (2.4967)	CoCr 20 W 15 Ni	L-605 Haynes 25 Stellite No. 25	Gas turbines
Aeralloy 617 Heat resistant nickel-based alloy with very good mechanical properties at high temperatures	2.4663	NiCr 23 Co 12 Mo	Inconel 617	Gas turbines, nuclear industry, air heaters
Coralloy 625 Nickel molybdenum niobium chrome alloy with high strength and toughness from ultra-low temperatures to 1100°C	2.4856	NiCr 22 Mo 9 Nb	Inconel 625	Aerospace, chem. process engineering, offshore rigs, nuclear industry
Aeralloy 718 **Aeralloy 718 Fine Grain** Precipitation hardenable high-temperature and corrosion resistant nickel-based alloy	2.4668	NiCr 19NbMo	Inconel 718	Gas turbines, pumps, nuclear industry, offshore
Aeralloy 720 Precipitation hardenable Ni-Cr-Co alloy, high-temperature and corrosion resistant	–	NiCr 18 Co 15 MoWTiAl	Udimet 720	Gas turbines, stationary
Aeralloy Waspaloy **Aeralloy Waspaloy Fine Grain** Precipitation hardenable high-temperature nickel-based alloy, oxidation resistant up to approx. 815°C	2.4654	NiCr 19 Co 14 Mo 4 Ti	Waspaloy	Turbine discs, compressor discs
Aeralloy X Corrosion and heat resistant nickel alloy	2.4665 2.4603	NiCr 22 Fe 18 Mo	Hastelloy X Nimonic P 13	Gas turbines, petrochemistry, nuclear industry
Aeralloy X-750 Precipitation hardenable nickel-chrome alloy, corrosion and oxidation resistant with high creep fracture resistance up to 815°C	2.4669	NiCr 15 Fe 7 TiAl	Inconel X-750	Gas turbines, nuclear industry, disc springs, vacuum shrouds

Nickel and cobalt materials

Material	No.	Alloy type	Standard designation *	Application
Aeralloy 751 Modification of the X-750 variant	2.4694	NiCr 16 Fe 7 TiAl	Alloy 751	Gas turbines, petrochemistry
Aeralloy 901 Precipitation hardenable high-temperature and corrosion resistant iron-nickel alloy	2.4662	NiCr 13 Mo 6 Ti 3	Nimonic 901	Gas turbines

Titanium und titanium alloys

Material	No.	Application
Pure titanium		
Aeralloy CP Ti-1 Pure titanium Gr. 1	3.7024	Pure titanium shows an outstanding corrosion resistance in oxidizing media. The mechanical properties are basically achieved through specified oxygen contents. Used for structural parts in aircraft, the chemical industry and heat exchangers. Pure titanium variant with good ductility and cold mouldability, adequate mechanical strength. Outstanding weldability. High corrosion resistance in strongly oxidizing (e.g. HNO3) to weakly reducing environments, including chlorides.
Aeralloy CP Ti-2 Pure titanium Gr.2	3.7034	Most usual pure titanium variant. Good availability. Good balance between mechanical strength and ductility.
Aeralloy CP Ti-4 Pure titanium Gr.4	3.7064	High mechanical strength and good weldability distinguish pure titanium Gr.4, accompanied by adequate corrosion resistance in neutral to oxidizing environments, including chlorides. An improvement in corrosion resistance in reducing media is achieved by the addition of about 0.2 wt.-% palladium (Pd) for the pure titanium variants Coralloy CP Ti-1/Ti-2/Ti-3. The mechanical properties are not influenced by this.
Near-Alpha-Titan		
Aeralloy Ti-Cu 2 Pure titanium alloyed with Cu	3.7124	Hardenable and weldable titanium variant. High resistance to creep and corrosion.
Aeralloy Ti-6-2-4-2 Titanium alloy, near α Ti-6Al-2Sn-4Zr-2Mo	3.7144	High-temperature alloy for service up to approx. 480°C, also for compressors in engines, e.g. discs, blades, impellers, seals. Also for valves in car engines.
Aeralloy Ti-6-2-4-2 S Titanium alloy, near α Ti-6Al-2Sn-4Zr-2Mo additionally 0,08 Si	–	Si-alloyed variant has still further improved creep resistance.
Aeralloy Ti-8-1-1 Titanium alloy, near-α Ti-8Al-1Mo-1V	–	High-temperature alloy for service up to approx. 480°C, compressors in engines, e.g. discs, blades. Excellent creep resistance.
Aeralloy Ti-834 Titanium alloy, near-α Ti-5.8Al-4Sn-3,5Zr-0,7 Nb-0,5Mo-0,35Si-0.06C	–	High-temperature alloy for service up to approx. 580°C, with peaks up to 600°C; improved mechanical strength and creep figures.
Alpha-Beta-Titanium		
Aeralloy Ti-6-4 Titanium alloy, α/β Ti-6Al-4V	3.7164	Most popular titanium material (alloyed). Used in the chemical industry, motor racing, aircraft construction, aerospace, in turbines (compressors) and jet engines (compressors).
Aeralloy Ti-6-6-2 Titanium alloy, α/β Ti-6Al-6V-2Sn	3.7174	High performance variant, even better mechanical properties than Aeralloy Ti-6-4.
Aeralloy Ti-4-4-2 Titanium alloy, α/β Ti-4Al-4Mo-2Sn	3.7184	High performance variant for aircraft structures, but also used in jet engines up to approx. 300°C, with peaks of up to 400°C.
Near-Beta-Titanium		
Aeralloy Ti-10-2-3 Titanium alloy, near-β Ti-10V-2Fe-3Al	–	Highly suitable for near net shape forming technology. Excellent fracture toughness/strength ratio.
Beta-Titanium		
Aeralloy Ti-15-3-3 Titanium alloy, β Ti-15V-3Cr-3Al-3Sn	–	Precipitation hardenable, meta-stable β alloy. Fundamentally this is a classical plate alloy, but because of its excellent cold formability it can also be used in combined processes. Where high temperatures play no excessively great role, it can be substituted for Ti-6-4.
Aeralloy Ti-3-8-6-4-4 Titanium alloy, β Ti-3Al-8V-6Cr-4Zr-4Mo	–	Meta-stable β alloy, cold formable and precipitation hardenable. Everywhere where high temperatures play no excessive role, Ti-Beta-C can be substituted for Ti-6-4. Above all its vibration resistance is better. However its specific gravity is some 15% higher than that of Ti-6-4.

We can offer you further materials and variants on request. *) Standard trade designations of: General Electric, Cabot, Haynes, Special Metals, Teledyne, Inco Group, VDM Nickel Technology, Republic Steel, IMI, United Technologies, Carpenter

WEISS KOMMUNIKATION 05/98