ALLOYS AND APPLICATIONS

MATERIAL	LNI DESIGNATION	STANDARD DESIGNATION	NOMINAL CHEMICAL COMPOSITION %	TYPICAL PROPERTIES	TYPICAL APPLICATIONS	DENSITY	TENSILE STRENGTH (N/mm²)		YIELD STRENGTH 0.2 % (N/mm²)		ELONGATION %		VICKERS HARDNESS	
							ANNEALED	COLD WORKED HARD	ANNEALED	COLD WORKED HARD	ANNEALED	COLD WORKED HARD	ANNEALED	COLD WORKED HARD
Copper	Cu-DHP	ISO Cu-DHP D SF-Cu 2.0090 USA Cu-DHP C 12200	Cu ≥ 99.85 P: 0.013-0.050	Pure copper deoxidized, high phosphorus, water and air resistant, electrical conductivity 85% IACS 40m/Ωmm²	Solder filled dial feet, rivets, tooth rings, thermometer bulbs, sparkero-sion electrodes, cooling devices	8.94	200-250	300-400	60-110	250-380	38-50	5-16	45-70	95-110
	Cu-OF	D SE-Cu 2.0070 USA Cu-OF C 10200	Cu ≥ 99.95	Pure, deoxidized copper, no embrittlement due to reducing gas, electrical conductivity 98% IACS ≥ 58 m/Ωmm²	Electrical connectors, electric cables, medical applications	8.94	200-250	300-400	60-110	250-380	38-50	5-16	45-70	95-110
Yellow Brass 63 %	CuZn37	ISO CuZn37 D CuZn37 2.0321 USA C 27400	Cu: 63 Zn: 37	Alloy for cold and hot working	Radio aerials, musical instruments, rivets, pointers shaft mechanisms, lighter bodies, fountain pen bodies, Bourdon springs, sparkerosion electrodes	8.43	320-380	450-600	100-230	360-550	30-50	5-15	70-100	130-200
Medium Leaded Brass	CuZn38Pb1.5	ISO CuZn38Pb2 D CuZn38Pb1.5 2.0371 USA C 35300	Cu: 61 Zn: 37.5 Pb: 1.5	Alloy with 2 phases (α+β) and super-fine lead distribution, for easy machining, or stamping	Tubular free-cut pieces, musical instruments	8.47	350-420	480-600	120-250	380-550	30-50	5-15	80-100	135-200
Red Brass 85 %	CuZn15	ISO CuZn15 D CuZn15 2.0240 USA C 23000	Cu: 85 Zn: 15	Gold-coloured alloy resistant to zinc loss and to stress corrosion	Solder filled dial feet, musical instruments, fountain pen bodies	8.75	280-340	400-550	100-200	300-500	40-60	5-15	60-90	120-180
Low Brass 80 %	CuZn20	ISO CuZn20 D CuZn20 2.0250 USA C 24000	Cu: 80 Zn: 20	The same properties. More easily cold workable	Bellows, musical instruments, solder filled dial feet, flexible waveguides luxury products	8.67	300-360	450-600	100-200	360-550	40-60	5-15	70-100	130-190
Phosphor Bronze 6 %	CuSn6	ISO CuSn6 D CuSn6 2.1020 USA C 51900	Cu: 94 Sn: 6 P: 0.2	Good wear and corrosion resistance properties	Bourdon springs, bellows	8.84	350-400	500-600	120-240	400-500	45-60	5-25	80-110	145-175
Phosphor Bronze 8 %	CuSn8	ISO CuSn8 D CuSn8 2.1030 USA C 52100	Cu: 91.5 Sn: 8.5 P: 0.2	Excellent wear and corrosion resistance properties, good bending fatigue strength	Bourdon springs, bellows, electronic probes, flexible waveguides	8.80	400-450	550-700	150-270	450-600	50-70	10-30	80-130	155-215
Beryllium Copper	CuBe2	CuBe2 USA C 17200 D 2.1247	Cu: 98 Be: 2 Co: 0.25	Precipitation hardening alloy extremely resistant to relaxation, fatigue, abrasion and corrosion	Bourdon springs for precision pressure gauges, flexible waveguides, tubes for connector plugs and thermic probes, radio aerials	8.23	450-500 + tempered 1000-1200	600-800 + tempered 1100-1300	200-300 + tempered 900-1100	500-750 + tempered 1000-1200	30-50 + tempered 3-12	5-20 + tempered 2-6	90-130 + tempered 340-400	170-250 + tempered 360-430
Nickel Silver 12 %	CuNi12Zn24	ISO CuNi12Zn24 D CuNi12Zn24 2.0730 USA C 75700	Cu: 63 Ni: 12 Zn: 24	Excellent properties for cold working, resists to tarnishing	Watch spring bars, endoscopes, musical instruments	8.69	350-420	500-600	120-250	400-500	40-50	10-20	80-115	150-180
Nickel Silver 18 %	CuNi18Zn20	ISO CuNi18Zn20 D CuNi18Zn20 2.0740 USA C 76400 C 75200	Cu: 61 Ni: 18 Zn: 21	Less easily cold workable but advantageous for manufacture of springs, high corrosion resistance	Bourdon springs, watch springs bars, solid profiles for watch bracelets musical instruments, spectacle parts	8.73	350-450	550-700	120-270	450-600	35-50	6-14	85-115	150-190
Aluminium	Al 99.5	ISO Al99.5 D Al99.5 3.0255 USA AA 1050 A	Al ≥ 99.5	High corrosion resistance, thermal and electrical conductivity, easy to work, good weldability, but low mechanical strength	Fountain pen bodies, casings for electrochemical elements, wire clamps, cryogenic applications	2.70	65-100	150-200	25-50	120-170	25-33	2-8	20-25	35-50
Anti-corodal 100	Al Mg Si 1	D AlMgSi1 3.2315 USA AA 6081	Al: 97.5 Mg: 0.6-1.0 Si: 0.7-1.3 Mn: 0.10-0.40	Hardenable alloy with good corrosion resistance, easy to work, perfectly suitable for polishing, high mechanical strength, suitable for decorative anodising	Pointers for measuring instruments	2.70	100-140	Solution annealed + tempered T6 350-420	35-70	Solution annealed + tempered T6 300-400	20-30	Solution annealed + tempered T6 2-6	30-40	Solution annealed + tempered T6 110-130
Mild steel	ACIER St 35	F XC 18 D St 35 1.0308 USA UNS K 02504	C: ≥ 0.17 Si: ≥ 0.35 Mn: ≥ 0.40 P: ≥ 0.050 S: ≥ 0.050	General use steel ductile before ease hardening	Machine industry	7.86	380-450	640-800	150-250	350-700	40-55	5-20	100-150	200-250

Other alloys, such as Cu ETP, Cu OFHC, Al 3103, Al 6060, Al 6061, AG4 (5086), can be delivered on request

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							ANNEALED	COLD WORKED HARD	ANNEALED	COLD WORKED HARD	ANNEALED	COLD WORKED HARD	ANNEALED	COLD WORKED HARD
Austenitic stainless steels	AISI 304	D X5 CrNi 18.10 1.4301 USA AISI 304 UNS S 30400	Fe: 72 Ni: 8.5–10 Cr: 17–20 C: ≤ 0.07	Regular grade of austenitic stainless steel: easy to coldwork and good corrosion resistance, creep resistant up to 700°C	Medical instruments, bellows, endoscopes	7.90	580–650	750–1000	220–360	500–900	40–55	5–20	150–190	250–300
	AISI 304 L	D X2 CrNi 19.11 1.4306 USA AISI 304 L UNS S 30403	Fe: 71 Ni: 8–12 Cr: 18–20 C: ≤ 0.03	Compared with the above grade, this low-carbon grade offers improved corrosion resistance	Wristbands for watches: Cryogenics Bellows	7.90	580–650	700–950	220–360	450–850	40–55	5–20	150–190	250–300
	AISI 316 L	D X2 CrNiMo 17.13.2; X2 CrNiMo 18-14-3 1.4404 1.4435 USA AISI 316 L UNS S 31603	Fe: 68 Ni: 11–14 Cr: 16.5–18.5 Mo: 2.5–3 C: ≤ 0.03	Low-carbon grade: excellent resistance to acid stress corrosion	Bourdon springs, bellows, electromechanical parts, thermometer bulbs, Food and chemical industries, heat exchangers, wristbands for watches	7.95	580–650	700–950	220–360	450–850	40–55	5–20	150–190	250–300
	AISI 316L VM	D X2 CrNiMo 1815.3 1.4441 USA AISI 316 L VM	Fe: 65 C: ≤ 0.030 Ni: 13 – 15 Cr: 17 – 19 Mo: 2.5 – 3.2 S: ≤ 0.010 P: ≤ 0.025	Vacuum melted austenitic stainless steel. No free ferrite phase and good microcleanliness.	Medical instruments Surgical implants Watch industries Automotive industries	7.95	580–650	700–950	220–360	450–850	40–55	5–20	150–190	250–300
	AISI 316 Ti	D X6 CrNiMoTi 17-12-2 1.4571 USA AISI 316 Ti UNS S 31635	Fe: 68 Ni: 10.5–13.5 Cr: 16.5–18.5 Mo: 2–2.5 Ti: 5 x C C: ≤ 0.10	Titanium-stabilised grade for improved stress corrosion resistance and reduced creep at high temperatures	Bourdon springs Bellows	7.95	580–650	750–1000	220–360	500–900	40–55	5–20	150–190	250–300
	AISI 321	D X6 CrNiTi 1810 1.4541 USA AISI 321 UNS S 32100	Fe: 71 Ni: 9–11.5 Cr: 17–19 Ti: 5 x C C: ≤ 0.10	Same typical properties as above	Bourdon tubes, bellows, special cooling circuits	7.90	600–700	750–1000	240–380	500–900	40–55	5–20	150–190	250–300
	AISI 347	D X6 CrNiNb 1810 1.4550 USA AISI 347 UNS S 34700	Fe: 71 Ni: 9–12 Cr: 17–19 Nb: 10C–1 C: 0.06	Niobium-stabilised grade for better high temperature properties: mechanical strength, oxidation resistance	Bourdon springs Bellows Aerospace heat exchangers	7.95	600–700	750–1000	240–380	500–900	40–55	5–20	150–190	250–300
Super austenitic stainless steel	AISI 904 L	D X1 NiCrMoCuN25-20-5 1.4539 USA AISI 904 L UNS N08904	Fe: 51 Ni: 24–26 Cr: 19–21 Mo: 4–5 Cu: 1–2 N: 0.04–0.15 C: ≤ 0.02	Very good resistance to sea water corrosion and to sulfuric and phosphoric acids	Tubes and profiles for chemical and watch industries	8.00	600–700	800–1000	220–380	500–900	35–55	5–20	150–190	250–300
Ferritic stainless steel	AISI 446	F Z12 CAS 25 D X10 CrAl24 X18CrN24 1.4762 1.4749 USA AISI 446 UNS S 44600	Fe: 72 Cr: 26 C: 0.18 N: 0.25	Good resistance to oxidation at high temperature	Instrumentation used at high temperature or in specific corrosion media	7.60	530–630	700–900	240–380	450–800	25–40	2–15	150–200	250–300
Iron-nickel-chromium alloy	Ni-Span C-902®	D Ni-Span C 902 USA Ni-Span C 902	Fe: 49 Ni: 41–43.5 Cr: 4.9–5.75 Ti: 2.20–2.75 Al: 0.3–0.8	Structure-hardenable alloy with constant elasticity modulus from –45°C to +65°C. Good fatigue strength and low mechanical hysteresis	Bourdon springs with constant modulus of elasticity. Transducers	8.05	600–700 + tempered 1000–1200	800–1000 + tempered 1200–1400	200–350 + tempered 900–1100	600–950 + tempered 1100–1300	30–50 + tempered 15–20	3–10 + tempered 5–10	150–190 + tempered 350–400	280–350 + tempered 380–450
Nickel	Nickel 200	D Ni 99.2 2.4066 USA Nickel 200 UNS N 02200	Ni: 99.5 C: 0.08	Good stress corrosion resistance: alkalis, chlorides, fluorides	Food and chemical industry. Heat exchangers	8.89	380–500	600–800	100–250	350–700	35–55	5–15	80–120	165–230
Nickel alloys	Monel 400®	D NiCu30Fe 2.4360 USA Monel 400 N 04400	Ni: 66.0 Cu: 31.5 Fe: 1.35	Excellent resistance to a variety of stress corrosion types	Bellows, hoses, rivets, medical instruments	8.83	450–600	700–850	180–330	450–750	35–50	5–15	100–150	200–250
	Monel K500®	D NiCu30Al 2.4375 USA Monel K500 N 05500	Ni: 65 Cu: 29.5 Fe: 1.0 Al: 2.8 Ti: 0.50	Structure-hardenable alloy with excellent corrosion resistance and high mechanical stability to low temperatures (–250°C)	Bourdon tubes	8.47	630–700 + tempered 900–1100	850–1000 + tempered 1050–1200	200–300 + tempered 800–1000	650–900 + tempered 950–1100	25–45 + tempered 20–30	15–25 + tempered 10–20	170–230 + tempered 280–330	250–300 + tempered 320–380
	Inconel 600®	D NiCr15Fe 2.4816 USA Inconel 600 N 06600	Ni: 72 Cr: 15.5 Fe: 8	Good corrosion and oxidation resistance up to 1175°C	Cooling circuits for space industry	8.42	600–700	800–1050	200–350	500–900	35–55	10–25	140–180	240–300

Other alloys, such as Aisi 316LS (Profile), Inconel 622 (C-22), Inconel 625, Steel CK22, Duplex1.44 62, Hastelloy C22, Inconel 625, Nimonic 75, can be delivered on request