Alloys

We develop alloys for the applications of today to shape the technologies of tomorrow.

Special Alloys

Diehl Metall DIN EN	DIN EN Symbol	Heat Treatment State	Mechanical Properties Brinell Hardness HBW 2.5/62.5 min.	Tensile strength [2] R_m (MPa) min.	Elastic limit [2] $Rp_{0.2}$ (MPa) min.	Elongation [2] A_5 (%) min.	Typical Applications	Material Behavior
356 [3] –	CuZn36Mn3Al2Si1		170-220 HBW2.5/62.5	630	330	13	Wear-resistant transmission parts, synchronizer rings	Very high strength, good sliding wear properties
363 / 364 [3] –	CuZn35Mn3Si1Pb1		80 [1] HRB	400	170	35	Structural parts in mechanical engineering	Good sliding wear properties
412 CW725R	CuZn33Pb1AlSiAs	H060	60 HBW2.5/62.5	280	120	20	Structural material	Resistant to dezincification, good resistance to seawater
416 CW626R	CuZn33Pb1.5AlAs	H060	60 HBW2.5/62.5	280	120	20	Structural material	Resistant to dezincification, suitable for use in faucet water; Complies with the German Drinking Water Ordinance DIN 50930-6
442 - CuTouch CW703R	CuZn23Al3Co		140 HBW2.5/62.5	480	340	32	Electrical engineering, contact surfaces, door handles, fittings	Tarnish-resistant, antimicrobial
452 CW713R	CuZn37Mn3Al2PbSi	H130	130 HBW2.5/62.5	580 550	270 200	20 8	Automotive parts such as synchronizer rings, gearshift forks, sliding blocks	Good wear properties, excellent oil corrosion resistance
454 CW713R	CuZn37Mn3Al2PbSi	H130	130 HBW2.5/62.5	580 550	270 200	20 8	Worm wheels, pump impellers	Good sliding properties, good oil corrosion resistance
455 [3] –	CuTn36Mn2Al1FePbSiSn		160 HBW2.5/62.5	580	270	20	Synchronizer rings, gearshift forks, sliding blocks	High strength, good toughness, good oil corrosion resistance
458 CW713R	CuZn37Mn3Al2PbSi	H130	130 HBW2.5/62.5	580 550	270 200	20 8	Synchronizer rings, gearshift forks, valve guides	High strength, good sliding wear properties
466 CW704R	CuZn23Al6Mn4Fe3Pb		200 HBW2.5/62.5	780 700	540 500	8 5	Coated synchronizer rings, bushings, worm wheels	Very high strength
467 [3] –	CuZn23Al6Mn4Fe3		200 HBW2.5/62.5	780	540	8	Coated synchronizer rings, bushings, worm wheels	Very high strength
470 [3] –	CuZn13Mn8Al5Si2Fe1Pb		180 HBW2.5/62.5	630	430	12	Wear-resistant transmission parts, synchronizer rings, sliding blocks	Very high strength
474 [3] –	CuZn13Mn8Al5Si2Fe1		180 HBW2.5/62.5	630	430	12	Wear-resistant transmission parts, synchronizer rings, sliding blocks	Lead-free
479 [3] –	CuZn30Mn3Al3Si1NiCr		195-225 HBW2.5/62.5	650	400	15	Synchronizer rings	High level of hardness, high wear resistance
482 [3] –	CuZn29Al4Ni3Co1SiFePb		190 HBW2.5/62.5	790	710	5	Synchronizer rings	High level of hardness, high wear resistance
488 [3] –	CuZn32Ni7Al4Si2Fe		240-300 HV50	830	720	3	Synchronizer rings	Highly wear resistant, high strength
489 [3] –	CuZn18Mn8Al5Si2Fe1Pb		220-300 HV50	840	800	5	Synchronizer rings	Highly wear resistant, high strength
490 [3] –	CuZn35Ni14Si4Pb		170 HV50	560	400	4	Synchronizer rings	Highly wear resistant
492 [3] –	CuZn18Mn8Al5Si2Fe1		220-300 HV50	840	800	5	Synchronizer rings	High-strength material with high corrosion resistance

Aluminum Bronze Alloys

700 CW307G	CuAl10Ni5Fe4	H170	170 HBW2.5/62.5	720 650	360 350	12 12	Bearings, worm wheels	High-strength material with high corrosion resistance

[1] Solution annealed and precipitation hardened

[2] Heat treated

[3] Not standardized to EN 12420

Information according to Diehl material data sheet

Information according to EN 12420

Standard Alloys

Diehl Metall DIN EN	DIN EN Symbol	Heat Treatment State	Mechanical Properties				Typical Applications	Material Behavior
			Brinell Hardness HBW 2.5/62.5 min.	Tensile strength [2] R_m (MPa) min.	Elastic limit [2] $Rp_{0.2}$ (MPa) min.	Elongation [2] A_5 (%) min.		
002 CW614N	CuZn39Pb3	H070	70	350	140	15	Primary alloy for forgings of all kinds: in particular for fittings, housings	Very good machinability, difficult to cold forge
003 CW617N	CuZn40Pb2	H070	70	350	140	15	Forgings of all kinds, particularly for thin-walled parts	Very good machinability, difficult to cold forge
008 CW612N	CuZn39Pb2	H070	70	350	140	15	Forgings for machining and cold forging	Good machinability, possible to cold forge
014 CW608N	CuZn38Pb2	H070	70	350	140	15	Forgings for machining and cold forging	Good machinability, possible to cold forge
015 CW610N	CuZn39Pb0.5		75	340	100	25	Fittings	Easy to hot and cold forge
040 CW004A	Cu-ETP	H040	40	200	50	30	Parts for the electrical industry	Easy to hot and cold forge, possible to polish
062 – Ecomerica CW511L	CuZn38As	H060	60	280	120	20	Suitable for use in the area of drinking water	**Resistance to dezincification** Possible to cold forge, machinable
095 CW111	CuNi2Si	H140 [1]	140	470	320	12	Screws and bolts	High strength, medium electrical conductivity
362 [3] –	CuZn36Mn3Si		120	450	320	15	Sliding components	Easy to cold forge, good sliding wear properties
402 CW602N	CuZn36Pb2As	H060	60	280	120	20	Fittings	Resistant to dezincification, possible to cold forge, easy to machine
430 – Cuphin CW724R	CuZn21Si3P	H120	120	500	250	15	Forgings of all kinds	Corrosion resistance, **lead-free alloy,** good machinability, high strength
451 CW720R	CuZn40Mn1Pb1	H080	85	350	160	15	Roller bearing cages, sliding components	Good machinability, medium strength
453 [3] –	CuZn37Mn1Al1FePbSi		110	440	180	20	Bevel gears, gears	Medium machinability Medium to high strength
460 CW710R	CuZn35Ni3Mn2AlPb	H100	100	440	180	10	Apparatus engineering, ship fittings	Medium machinability, resistant to seawater, medium to high strength

[1] Solution annealed and precipitation hardened [2] Heat treated [3] Not standardized to EN 12420

Information according to Diehl material data sheet

Information according to EN 12420

Aluminum Alloys

Diehl Metall DIN EN	DIN EN Symbol	Heat Treatment Condition	Cross Sectional Dimension t [2] in mm	Mechanical Properties						Typical Applications	Material Behavior
				Brinell Hardness [3] HB 2.5/62.5 min.	Tensile strength R_m (MPa) L [4] min.	T [5] min.	Elastic limit $Rp_{0.2}$ (MPa) L [4] min.	T [5] min.	Elongation A_5 (%) L [4] min.	T [5] min.	
502 AW 2014	AlCu4Mg1	T4	t ≤ 100	105	420		260		8		Mechanical engineering, fastening elements	Hardens at room temperature, high strength
503 AW 7075	AlZn5.5MgCu	T6	t ≤ 50	135	510	480	430	410	7	4	Vehicle construction, mechanical engineering, aviation industry	Hardens by tempering, maximum strength
			50 < t ≤ 100	130	500	470	425	400	6	4		
		T73	t ≤ 50	120	455	420	385	360	6	4		
			50 < t ≤ 100	112	445	410	375	350	6	3		
506 AW 2014	AlCu4SiMg	T6	t ≤ 50	120	440	430	380	370	6	3	Vehicle construction, mechanical engineering, aviation industry	Hardens by tempering, maximum strength
			50 < t ≤ 100	120	440	430	370	360	6	3		
510 AW 6082	AlSi1MgMn	T6	t ≤ 100	90	310	290	260	250	6	5	Electrical engineering, vehicle construction, mechanical engineering	Hardens at room temperature and by tempering, medium strength
511 [1] AW 6012	AlMgSiPb		t ≤ 100	80	275	260	220	200	6	5	Parts for machining across a large surface area	Hardens at room temperature and by tempering, easy to machine
519 [1] –	AlSi12.5MgCuNi	T6	–	90	270		210		5		Structural parts with increased wear resistance, transmission parts	Hardens by tempering, medium strength

Besides these alloys, we also produce forgings made of other aluminum alloys upon request.

1) Not standardized according to EN 586
2) Diameter of the largest sphere which can be drawn into the forging
3) For acceptance tests if no tensile test can be carried out
4) Direction parallel to the main fiber flow
5) Any direction which is not parallel to the main fiber flow

T4 = Undergoes solution heat treatment and natural aging
T6 = Undergoes solution heat treatment and artificial aging
T73 = Undergoes solution heat treatment and is artificially overaged (artificial aging) to achieve optimum resistance to stress corrosion cracking