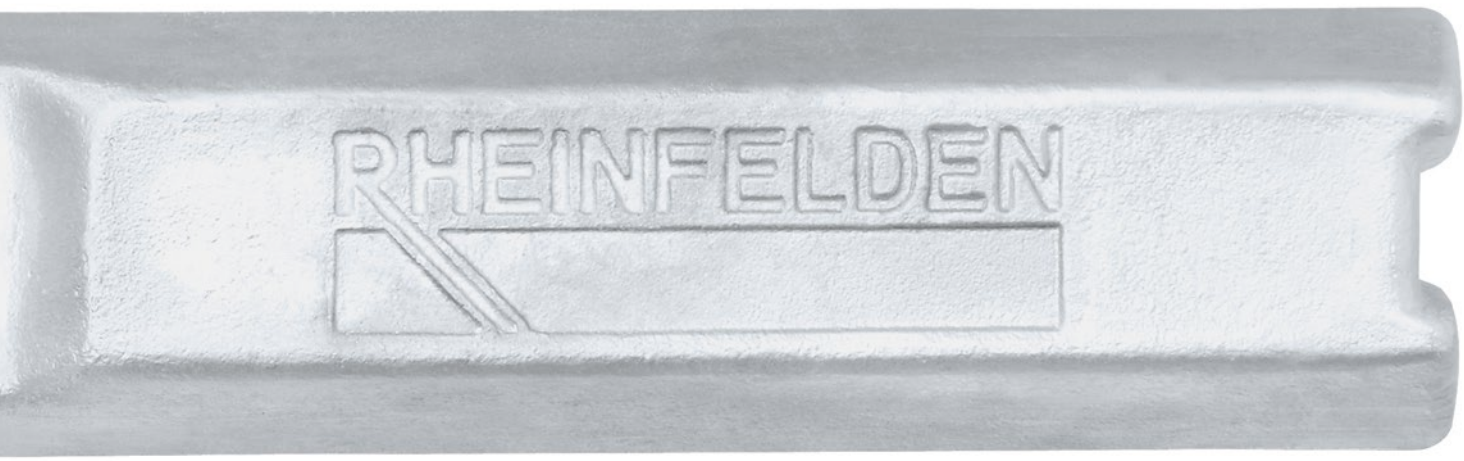
Primary aluminium
Casting alloys

RHEINFELDEN ALLOYS



RHEINFELDEN
Solutions thru Innovation

Quick finder for selecting the right alloy

The first step in producing a casting is to select the alloy most suited to the production process and requirements. The table covering these two pages provides an overview of our most common materials, their areas of use and properties. It will help you chose the right casting material. This table is no substitute for the service provided by our technical advisors, but does provide an overview and allows users to access the information as and when they need it.

Alloy	Chemical denomination	Areas of use																				
		Architecture	*Fittings*	*Cars*	*Builder's hardware*	*Lighting*	*Aircraft*	*Heavy casting*	*Domestic appliances*	*Electrical conductors*	*Air conditioning*	*Automotive engineering*	*Manufacture of engines*	*Art casting*	*Foodstuffs industry*	*Mechanical engineering*	*Model/mould construction*	*Optics/furniture*	*Shipbuilding*	*Chemical industry*	*Textile industry*	*Defence engineering*
Anticorodal-04	AlSi0.5Mg									x					x	x		x		x			
Anticorodal-50	AlSi5Mg	x	x			x			x		x			x	x	x	x	x	x	x			
Anticorodal-70	AlSi7Mg0.3	x	x	x		x	x		x		x	x	x	x	x	x	x		x	x		x	
Anticorodal-78dv	AlSi7Mg0.3	x		x			x					x	x		x	x			x	x	x	x	
Anticorodal-71	AlSi7Mg0.3-E									x													
Anticorodal-72	AlSi7Mg0.6	x					x		x			x			x	x	x		x	x		x	
Silafont-30	AlSi9Mg		x	x		x		x	x		x	x	x	x	x	x			x		x	x	
Silafont-36	AlSi10MnMg	x	x	x		x	x		x		x	x			x	x			x			x	
Silafont-38	AlSi9MnMgZn	x		x		x		x	x		x	x				x					x	x	
Silafont-09	AlSi9		x	x		x			x		x	x			x	x			x			x	
Silafont-13	AlSi11	x							x		x				x	x							
Silafont-20	AlSi11Mg	x		x				x				x			x	x							
Silafont-70	AlSi12CuNiMg			x								x											
Silafont-90	AlSi17Cu4Mg			x								x											
Castaman-35	AlSi10MnMg		x	x		x			x		x	x		x	x	x			x				
Castasil-37	AlSi9MnMoZr	x		x		x	x		x		x	x			x	x			x			x	
Castasil-21	AlSi9Sr			x		x				x	x					x			x			x	
Unifont-90	AlZn10Si8Mg							x	x							x	x	x			x	x	
Unifont-94	AlZn10Si8Mg			x								x				x		x					
Castadur-30	AlZn3Mg3Cr	x		x		x			x			x		x			x	x					
Castadur-50	AlZn5Mg	x				x			x					x		x	x	x					
Peraluman-30	AlMg3	x	x		x	x			x		x			x	x	x	x	x	x	x			
Peraluman-36	AlMg3Si	x	x		x	x		x	x					x	x	x	x	x		x			
Peraluman-50	AlMg5	x	x		x	x			x		x			x	x			x	x	x		x	
Peraluman-56	AlMg5Si	x	x			x			x		x			x	x	x		x	x	x			
Magsimal-59	AlMg5Si2Mn	x		x			x		x		x	x			x	x		x	x	x		x	
Alufont-47	AlCu4TiMg			x								x				x					x	x	
Alufont-48	AlCu4TiMgAg			x								x	x			x						x	
Alufont-52	AlCu4Ti			x								x	x			x					x	x	
Alufont-60	AlCu5NiCoSbZr			x									x									x	
Thermodur-72	AlMg7Si3Mn			x			x				x	x	x			x			x	x			
Thermodur-73	AlSi11Cu2Ni2Mg2Mn			x							x	x	x			x						x	
Rotoren-Al 99.7	Al99.7-E			x		x				x					x		x	x		x			
Aluman-16	AlMn1.6			x							x	x				x							

● excellent
◕ very good
◑ good
◔ all right
○ poor
– not applicable

Appropriate casting method: Sand casting	Gravity die casting	High pressure die casting	Distinguishing properties: Flangeability	Electrical conductivity	Suitable for decorative anodising	Suitable for technical anodising	Suitable for punch riveting	Strength in as-cast state	Casting properties	Elongation	Hardness	Corrosion resistance	For constructions with thin walls	For constructions with thick walls	Hard solderability	Maximum strength at 20 °C	Resistance to salt water	Polishability	Impact toughness/ductility	Weldability	Machinability at F	Machinability following T6	Wear resistance	Mechanical properties at elevated temperatures (200 °C)
◑	◑	◑	●	●	◕	●	◕	◑	◑	◑	◑	●	◕	●	◕	◑	●	●	◑	◕	◔	◕	–	◔
◕	◑	–	–	◔	◔	●	–	◕	◑	◑	◕	●	◑	●	–	◕	●	◕	◑	◕	◑	◕	–	◔
◕	◕	–	–	◑	○	●	◑	◕	◕	◕	◕	●	◑	●	–	◕	◕	◕	●	◕	◑	◕	–	◔
◕	◕	–	–	◑	○	●	◑	◕	◕	◕	◕	●	◑	●	–	◕	◕	◕	●	◕	◑	◕	–	◔
◕	◕	–	–	◕	○	●	–	◑	◑	◑	◕	●	◑	●	–	◕	–	◕	●	◕	–	◕	–	◔
◕	◕	–	–	◔	○	●	○	◕	◕	◑	◕	●	◑	●	–	◕	◕	◕	●	◕	–	◕	○	◔
●	●	–	–	–	–	●	–	◕	●	◑	◕	◕	◕	●	–	◕	–	◑	◕	●	◑	◕	–	◔
–	–	●	●	○	–	●	●	◕	●	●	◑	●	◕	●	–	◕	–	◑	◕	●	◕	◕	–	◔
–	–	●	–	–	–	◑	◕	◕	●	◕	◑	◕	◕	◑	–	◕	–	◑	◕	●	◕	◕	–	◔
–	–	●	◕	–	–	◕	◕	◕	●	◑	◑	◕	◕	●	–	◑	–	◑	◑	●	◕	–	–	◔
●	●	–	●	○	–	◑	○	◑	◕	●	◔	◕	●	◑	–	◑	–	◔	◕	●	◑	–	○	◔
●	●	–	–	–	–	◑	–	◑	◕	◕	◑	◕	●	◑	–	◕	–	◔	◕	●	◕	◕	○	◔
◕	◕	◕	–	–	–	◑	–	◑	◕	◔	●	◔	●	◕	–	◕	–	◑	–	●	–	◕	●	●
◕	◕	◑	–	–	–	◑	–	◕	◕	◔	●	◔	●	◕	–	◕	–	◑	–	◕	–	●	●	●
–	–	●	◕	–	–	●	●	◕	●	◕	◑	●	◕	●	–	◕	–	◑	◕	●	◕	◕	–	◔
–	–	●	◑	–	–	●	●	◕	●	●	◑	●	●	◑	–	◑	–	◑	●	●	◕	–	–	◔
–	–	◕	◕	◕	–	●	◑	◑	●	◑	◑	◕	◕	◑	–	◑	–	◑	◑	●	◕	–	–	◔
◕	◕	–	–	–	–	●	–	●	◕	◔	◕	◑	◕	●	–	◕	–	◕	–	◕	◕	–	○	◔
–	–	◕	–	–	–	●	–	●	◕	◔	◕	◑	◑	●	–	◕	–	◕	–	◕	◕	–	–	◔
◑	◑	–	◕	–	●	●	–	◕	◑	●	◑	●	◑	◕	–	◑	–	●	●	◑	●	–	–	–
◑	–	–	◑	–	●	●	–	◕	◑	◕	◑	◑	◔	◕	–	◑	–	●	◕	◑	●	–	–	–
◑	◑	–	◕	–	●	●	–	◑	◑	◕	◑	●	◑	◕	–	◑	●	●	●	◑	●	–	–	◑
◑	◑	–	–	–	◑	●	–	◑	◕	◑	◑	●	◑	◕	–	◑	●	●	◕	◕	●	–	–	◑
◑	◑	–	◕	–	●	●	–	◑	◑	◕	◑	●	◑	◕	–	◑	●	●	●	◑	●	–	–	◑
◑	◑	–	–	–	◑	●	–	◑	◕	◑	◑	●	◑	◕	–	◑	●	●	◕	◕	●	–	–	◑
–	–	◕	◕	–	◑	●	●	●	◕	●	◑	●	●	◔	–	◕	●	●	●	●	●	–	–	◑
◑	◑	–	–	–	●	●	–	◑	◑	●	◕	◔	◑	◕	–	●	–	◕	●	◑	–	●	–	◑
◑	◔	–	–	–	●	●	–	◑	◑	◕	●	◔	◑	◕	–	●	–	◕	●	◑	–	●	–	◑
◕	◑	–	–	–	●	●	–	◑	◑	●	●	◔	◑	◕	–	●	–	◕	●	◑	–	●	–	◑
◑	◑	–	–	–	–	●	–	◑	◑	◔	◕	○	◑	◕	–	◑	–	◕	–	○	–	●	○	●
–	◑	◕	–	–	◑	◕	○	●	◑	◕	◑	●	◕	◔	–	◕	●	●	◑	◕	●	–	–	●
◕	◕	◕	–	–	–	◑	–	◑	◕	◔	●	○	●	◕	–	◕	–	◑	–	●	–	◕	○	●
◑	◑	◑	●	●	●	●	–	◔	◑	●	◔	●	◕	◕	●	◔	●	●	●	◕	◔	–	–	–
◑	◔	◑	◑	–	●	●	◕	◑	◑	●	◔	●	◕	◕	●	◑	●		◑	–	◔	–	–	◑

Tables for selecting alloys

The tables will aid designers in selecting the suitable casting alloy for the casting they are producing.
They contain details of the 0.2 % yield tensile strength, elongation and corrosion resistance.
The values indicate the performance of the alloys which can be achieved through appropriate casting technology work in the casting or its sub-sections.

Sand casting, as-cast state

Elongation A [%] \ 0.2 % yield tensile strength $R_{p0.2}$ [MPa]	60–120	90–160	200–230
0.5–3		Silafont-70 Silafont-20	Unifont-90 T1 Thermodur-73
3–6	Anticorodal-70/-78 dv Silafont-30 Peraluman-30/-36 Peraluman-50	Anticorodal-50 Peraluman-56 Castadur-50	
6–13	Silafont-13	Castadur-30	

Sand casting, heat-treated

Elongation A [%] \ 0.2 % yield tensile strength $R_{p0.2}$ [MPa]	90–160	160–300	300–450
0.3–3	Peraluman-56 T6	Anticorodal-50 T6 Anticorodal-72 T6 Silafont-20 T6 Silafont-70 T6	
2–5		Anticorodal-70/-78 dv T6 Silafont-30 T6 Peraluman-36	Alufont-47 T6 Alufont-48 T6 Alufont-52 T6
4–8	Anticorodal-70/-78 dv T64 Silafont-13 O Peraluman-30 T6	Anticorodal-50 T4 Alufont-47 T4 Alufont-48 T64 Alufont-52 T64	

Gravity die casting, as-cast state

Elongation A [%] \ 0.2 % yield tensile strength $R_{p0.2}$ [MPa]	70–100	90–180	180–260
0.5–2			Silafont-70 Silafont-90 Thermodur-73
2–6	Peraluman-36	Anticorodal-50 Anticorodal-70 Silafont-30 Peraluman-56	Unifont-90 T1
6–20	Peraluman-30	Silafont-13 Silafont-20 Peraluman-50	Thermodur-72

Tables for selecting alloys

Treatment state

F	As-cast state
O	Annealed
T1	Self-aged

T4	Naturally aged
T5	Stabilised
T5	Quenched and aged

T6	Artifically aged
T64	Partially aged
T7	Overaged

Gravity die casting, heat-treated

Elongation A [%]	0.2 % yield tensile strength $R_{p0.2}$ [MPa] 120 – 200	200 – 300	300 – 450
0.5 – 4		Anticorodal-50 T6	Silafont-70 T6 Silafont-90 T6 Alufont-36 T6
4 – 8	Anticorodal-50 T4 Peraluman-56 T6	Anticorodal-70/-78 dv T6 Anticorodal-72 T64 Silafont-30 T6 Silafont-20 T6	Alufont-47 T6 Alufont-48 T6 Alufont-52 T6
8 – 12	Anticorodal-70/-78 dv T64 Silafont-13 O Peraluman-30 T6	Alufont-47 T4 Alufont-52 T64	

High pressure die casting

Elongation A [%]	0.2 % yield tensile strength $R_{p0.2}$ [MPa] 80 – 120	120 – 220	220 – 280
– 1			Silafont-90 Thermodur-73
1 – 5		Silafont-38	Unifont-94 T1
5 – 20	Anticorodal-04 Silafont-36 T4 Aluman-16 Castasil-21	Silafont-09 Silafont-36 Magsimal-59 Castasil-37 Silafont-36 T5 / T7 Thermodur-72 Castaman-35	Silafont-36 T6 Silafont-38 T6

Corrosion resistance

Corrosion resistance	Castability average	good	very good	excellent
with surface protection	Alufont-47/-48 Alufont-52/-60 Silafont-90	Silafont-70 Thermodur-73		
from weathering	Castadur-30/-50		Silafont-30 Unifont-90 Unifont-94 Castasil-37 Castasil-21	Silafont-13 Silafont-20 Silafont-09 Silafont-36 / -38 Castaman-35
from salt water	Anticorodal-04 Peraluman-30/-36 Peraluman-50/-56	Anticorodal-50 Anticorodal-70/-78dv Anticorodal-71 Anticorodal-72	Magsimal-59 Thermodur-72	

Mechanical properties

For sand and permanent mold castings, the mechanical properties were determined on both separately cast test bars and on samples taken from the castings. For diecastings, only separately cast plates or bars were used. The mechanical property ranges demonstrate the performance of the alloys, as well as the effects of casting method and alloy choice. Maximum values serve only as indication of values that can be achieved within a casting or one part of a casting when the most favorable casting method and the best cast-

Alloy denomination	Numerical denomination	Chemical denominationg	Casting process	Treatment state	0.2%-yield tensile strength $R_{p0.2}$ MPa	Ultimate tensile strength R_m MPa	Elongation A %	Brinell hardness HBW 5/250–30	Fatigue resistance σ_{bw} MPa
Anticorodal-04		AlSi0.5Mg	S	F	60–100 (50)	90–130 (80)	15–20 (10)	35–40 (35)	
			S	T7	160–180 (150)	190–210 (180)	3–5 (3)	70–75 (70)	
			K	F	80–120 (70)	100–140 (90)	18–22 (12)	40–45 (40)	
			K	T7	170–190 (150)	200–220 (190)	3–6 (3)	70–80 (70)	
			D	F	80–120	100–140	7–12	40–45	
Anticorodal-50		AlSi5Mg	S	F	100–130 (90)	140–180 (130)	2–4 (1)	60–70 (55)	60–65
			S	T4	150–180 (120)	200–270 (150)	4–10 (2)	75–90 (70)	70–75
			S	T6	220–290 (160)	260–320 (180)	2–4 (1)	95–115 (85)	70–75
			K	F	120–160 (100)	160–200 (140)	2–5 (1)	60–75 (60)	70–75
			K	T4	160–190 (130)	210–270 (170)	5–10 (3)	75–90 (70)	80–85
			K	T6	240–290 (180)	260–320 (190)	2–7 (1)	100–115 (90)	80–85
Anticorodal-70	42 100	AlSi7Mg0.3	S	F	80–140 (80)	140–220 (140)	2–6 (2)	45–60 (45)	
			S	T64	120–170 (120)	200–270 (200)	4–10 (4)	60–80 (55)	
			S	T6	220–280 (200)	240–320 (240)	3–6 (2.5)	80–110 (80)	90–100
			K	F	90–150 (90)	180–240 (180)	4–9 (2)	55–70 (50)	
			K	T64	180–200 (140)	250–270 (220)	8–12 (5)	80–95 (80)	
			K	T6	220–280 (200)	290–340 (250)	5–9 (3.5)	90–125 (90)	
Anticorodal-71		AlSi7Mg0.3-E	S	T7	160–200 (150)	220–250 (210)	2–4 (2)	70–80 (70)	
			K	T7	160–200 (150)	220–250 (210)	4–6 (3)	70–80 (70)	
Anticorodal-72	42 200	AlSi7Mg0.6	S	T6	220–280 (220)	250–320 (250)	1–2 (1)	90–110 (90)	90–110
			K	T64	210–240 (150)	290–320 (230)	6–8 (3)	90–100 (90)	
			K	T6	240–280 (220)	320–350 (270)	4–6 (2.5)	100–115 (100)	110–115
Silafont-30	43 300	AlSi9Mg	S	F	80–140 (80)	160–220 (150)	2–6 (2)	50–70 (50)	65–75
			S	T6	200–310 (180)	250–330 (220)	2–5 (2)	80–115 (75)	80–100
			K	F	90–150 (90)	180–240 (180)	2–9 (2)	60–80 (60)	80–100
			K	T64	180–210 (140)	250–290 (220)	6–10 (3)	80–90 (80)	
			K	T6	210–310 (190)	290–360 (240)	4–7 (2)	90–120 (90)	90–110
Silafont-36	43 500	AlSi10MnMg	D	F	120–150	250–290	5–11	75–95	80–90
			D	T5	155–245	275–340	4–9	80–110	
			D	T4	95–140	210–260	15–22	60–75	
			D	T6	210–280	290–340	7–12	90–110	
			D	T7	120–170	200–240	15–20	60–75	
Silafont-38		AlSi9MnMgZn	D	F	140–160	270–300	3–7	80–105	
			D	Water-T6	230–260	300–345	6–9	90–115	
			D	Air-T6	180–200	250–275	8–10	80–110	
Silafont-09	44 400	AlSi9	D	F	120–180	220–280	4–8	55–80	60–70
Silafont-13		AlSi11	S	F	70–120 (70)	150–210 (150)	7–13 (6)	45–60 (45)	55–70
			S	O	60–120 (60)	150–210 (150)	9–15 (8)	45–60 (45)	85–100
			K	F	80–150 (80)	170–240 (160)	7–16 (6)	45–60 (45)	70–90
			K	O	60–120 (60)	180–240 (160)	10–18 (10)	45–65 (45)	90–110
Silafont-20	44 000	AlSi11Mg	S	F	80–140 (70)	170–220 (170)	2–4 (1.5)	50–60 (50)	65–75
			S	T6	120–300 (110)	200–320 (200)	1–3 (0.5)	65–120 (55)	90–120
			K	F	80–130 (80)	180–230 (180)	3–16 (3)	55–75 (55)	80–100
			K	T6	125–320 (120)	210–350 (210)	4–15 (3)	70–125 (70)	100–120
Silafont-70	48 000	AlSi12CuNiMg	S	F	120–170 (110)	130–180 (120)	0.5–1.5 (0.5)	80–90 (80)	75–85
			K	F	190–260 (180)	200–270 (190)	1.0–2.5 (0.5)	90–105 (90)	80–90
			K	T6	320–390 (280)	350–400 (300)	0.5–2.0 (0.5)	135–160 (130)	100–110
			K	T5	185–210 (150)	200–230 (180)	0.5–2.0 (0.5)	90–110 (90)	
Silafont-90		AlSi17Cu4Mg	K	F	170–225 (160)	180–235 (170)	0.4–0.9 (0.3)	110–120 (110)	
			K	T5	160–225 (160)	165–230 (165)	0.4–0.8 (0.3)	105–115 (110)	
			D	T5	220–265	230–295	0.5–1.0	110–120	
Castaman-35		AlSi10MnMg	D	T6	180–260	250–320	6–12	80–110	

ing techniques are used. Values in parentheses represent minimum values for castings with wall thicknesses up to 20 mm. Metal impurities – particularly elevated iron content – influence the properties of aluminium casting alloys. The primary alloys supplied by RHEINFELDEN contain less than 0.15% Fe unless higher values are necessary. The narrow alloying limits of our alloys assure stable casting behaviour and other properties.

Alloy denomination	Numerical denomination	Chemical denominationg	Casting process	Treatment state	0.2%-yield tensile strength $R_{p0.2}$ MPa	Ultimate tensile strength R_m MPa	Elongation A %	Brinell hardness HBW 5/250–30	Fatigue resistance σ_{bw} MPa
Castasil-37		AlSi9MnMoZr	D 2–3 mm	F	120–150	260–300	10–14	60–75	
			D 3–5 mm	F	100–130	230–280	10–14	60–75	80–95
			D 5–7 mm	F	80–110	200–250	10–14	60–75	
Castasil-21		AlSi9Sr	D	F	90–100	200–230	6–9	60–70	
			D	O	80–90	170–190	9–15	55–65	
Unifont-90	71 100	AlZn10Si8Mg	S	T1	190–230 (170)	220–250 (180)	1–2 (1)	90–100 (90)	80–100
			K	T1	220–250 (220)	280–320 (230)	1–4 (1)	100–120 (95)	90–110
Unifont-94		AlZn10Si8Mg	D	T1	230–280	300–350	1–4	105–120	70–90
Castadur-30		AlZn3Mg3Cr	K	T1	140–160	260–290	10–20	75–85	
Castadur-50		AlZn5Mg	S	T1	160–200	220–280	5–10	75–85	
Peraluman-30	51 100	AlMg3	S	F	70–100 (60)	170–190 (140)	4–8 (4)	50–60 (45)	70–80
			S	T6	140–160 (110)	200–240 (160)	6–8 (5)	65–75 (60)	75–85
			K	F	70–100 (70)	170–210 (150)	9–16 (6)	50–60 (50)	90–100
			K	T6	140–160 (110)	240–260 (180)	15–20 (12)	70–80 (70)	100–110
Peraluman-36		AlMg3Si	S	F	80–100 (70)	140–190 (130)	3–8 (3)	50–60 (45)	60–65
			S	T6	160–220 (140)	220–280 (180)	2–8 (2)	70–90 (65)	75–80
			K	F	70–100 (70)	160–210 (160)	6–14 (5)	50–65 (50)	70–80
			K	T6	160–220 (150)	250–300 (220)	5–15 (5)	75–90 (75)	80–90
Peraluman-50	51 300	AlMg5	S	F	100–120 (90)	190–250 (170)	10–15 (8)	55–70 (50)	60–80
			K	F	100–140 (100)	200–260 (180)	10–25 (8)	60–75 (55)	70–80
Peraluman-56	51 400	AlMg5Si	S	F	110–130 (100)	160–200 (140)	3–4 (2)	60–80 (55)	60–80
			S	T6	110–160 (110)	180–220 (160)	3–4 (2)	70–80 (65)	70–90
			K	F	110–150 (100)	180–240 (150)	3–5 (3)	65–85 (60)	70–80
			K	T6	110–160 (110)	210–260 (200)	3–18 (5)	75–85 (70)	70–90
Magsimal-59	51 500	AlMg5Si2Mn	D 2–4 mm	F	160–220	310–340	12–18	85–105	90–100
			D 4–6 mm	F	140–170	250–320	9–14	80–90	
			D 6–12 mm	F	120–145	220–260	8–12	75–85	
Alufont-47	21 000	AlCu4MgTi	S	T4	220–280 (180)	300–400 (240)	5–15 (3)	90–115 (85)	80–100
			S	T6	240–350 (220)	350–420 (280)	3–10 (1)	95–125 (90)	80–100
			K	T4	220–300 (200)	320–420 (280)	8–18 (5)	95–115 (90)	100–110
Alufont-48		AlCu4MgAgTi	S	T64	200–270 (180)	370–430 (320)	14–18 (7)	105–120 (100)	
			S	T6	410–450 (320)	460–510 (380)	3–7 (2)	130–150 (125)	80–100
			K	T6	410–460 (340)	460–510 (440)	5–8 (3)	130–150 (130)	100–110
Alufont-52	21 100	AlCu4Ti	S	T64	210–240 (180)	300–360 (260)	8–15 (4)	90–100 (90)	80–100
			S	T6	300–420 (280)	400–475 (350)	3–4 (2)	125–145 (120)	80–100
			K	T64	210–250 (190)	360–400 (300)	12–20 (10)	90–120 (90)	100–110
			K	T6	310–400 (300)	420–475 (400)	7–16 (4)	130–145 (130)	100–110
Alufont-60		AlCu5NiCoSbZr	S	T7	145–165 (140)	180–220 (180)	1–1.5 (1)	85–95 (85)	90–100
			S	O	160–180 (160)	180–200 (180)	1–1.5 (1)	80–90 (80)	90–100
Thermodur-72		AlMg7Si3Mn	D	20 °C	190–220	350–380	7–10	80–100	
			D	150 °C/500 h[1)]	220–245	260–290	<15		
			D	225 °C/500 h[1)]	150–175	180–205	<20		
Thermodur-73		AlSi11Mg2Cu2Ni2	D	20 °C	270–300	300–320	<1	130–150	
			D	150 °C/500 h[1)]	280–310	330–355	<1		
			D	225 °C/500 h[1)]	130–155	250–280	1–2		
Rotoren-Al 99.7		Al99.7-E	D	F	20–40	80–120	10–25	15–25	
Aluman-16		AlMn1.6	D	F	90–120	160–180	8–15	40–60	
			S	F	80–100	130–160	4–8	40–50	

The details relating to the casting method use the following abbreviations:

S Sand casting

K Gravity die casting

D High pressure die casting

1) Long-term aged; tested at temperature

Chemical compositions

Alloys of a consistently high purity are key to producing high-quality castings. The RHEINFELDEN ALLOYS quality system allows this level of purity to be met.

The main alloy components are printed in bold. Individual values in the table are the maximum contents of alloy and accompanying elements. The alloys which RHEINFELDEN ALLOYS supplies sometimes have narrower alloy component ranges and a lower content of impurity than stipulated in the standard. This ensures good uniformity in the casting process and other properties.

European standard EN 1676 for alloyed aluminium in ingots applies. The numerical alloy denomination is based on the European standard (EN). Alloys without these denominations are not included in the EN or have wider limits in composition. Alloys with special compositions can be produced by agreement.

In the case of aluminium-silicon alloys, on request a modified microstructure with sodium (modified subsequently or in advance) or strontium (permanently modified) can be set rather than the granular microstructure. This choice is indicated by the denomination (Na/Sr) in the last column.

Brand name	**Chemical denomination**	**Numerical denomination**	**Composition** [% of mass]							
			Si	**Fe**	**Cu**	**Mn**	**Mg**	**Zn**	**Ti**	**other**
Anticorodal-04	AlSi0.5Mg		**0.3 – 0.6**	**0.8**	0.01	0.01	**0.3 – 0.6**	0.07	**0.01**	
Anticorodal-50	AlSi5Mg		**5.0 – 6.0**	0.15	0.02	0.10	**0.4 – 0.8**	0.10	**0.20**	
Anticorodal-70	AlSi7Mg0.3	42 100	**6.5 – 7.5**	0.15	0.02	0.10	**0.30 – 0.45**	0.07	**0.18**	**(Na/Sr)**
Anticorodal-78dv	AlSi7Mg0.3	42 100	**6.5 – 7.5**	0.12	0.02	0.05	**0.30 – 0.45**	0.07	**0.18**	**Sr**
Anticorodal-71	AlSi7Mg0.3-E		**6.5 – 7.5**	0.15	0.01	0.01	**0.30 – 0.45**	0.07	**0.01**	**(Na/Sr)**
Anticorodal-72	AlSi7Mg0.6	42 200	**6.5 – 7.5**	0.15	0.02	0.05	**0.50 – 0.70**	0.07	**0.18**	**(Na/Sr)**
Silafont-30	AlSi9Mg	43 300	**9.0 – 10.0**	0.15	0.02	0.05	**0.30 – 0.45**	0.07	0.15	**(Na/Sr)**
Silafont-36	AlSi10MnMg	43 500	**9.5 – 11.5**	0.15	0.03	**0.5 – 0.8**	**0.1 – 0.5**	0.07	0.15	**Sr**
Silafont-38	AlSi9MnMgZn		**8.5 – 10.0**	0.15	**0.1 – 0.4**	**0.5 – 0.8**	**0.1 – 0.5**	**0.1 – 0.4**	0.15	**Sr**
Silafont-09	AlSi9	44 400	**9.5 – 10.6**	**0.4**	0.02	**0.4**	0.05	0.10	0.10	
Silafont-13	AlSi11		**10.0 – 13.5**	0.15	0.02	0.05	0.05	0.07	0.15	**(Na/Sr)**
Silafont-20	AlSi11Mg	44 000	**10.0 – 11.8**	0.15	0.02	0.05	**0.10 – 0.45**	0.07	0.15	**(Na/Sr)**
Silafont-70	AlSi12CuNiMg	48 000	**11.0 – 13.5**	0.15	**0.8 – 1.3**	0.05	**0.9 – 1.3**	0.10	0.10	**0.8 – 1.3 Ni**
Silafont-90	AlSi17Cu4Mg		**16.0 – 18.0**	0.3	**4.0 – 5.0**	0.15	**0.5 – 0.6**	0.10	0.20	
Castaman-35	AlSi10MnMg		**9.5 – 11.0**	0.2	0.03	**0.5 – 0.8**	**0.2 – 0.5**	0.10	0.15	**Sr**
Castasil-37	AlSi9MnMoZr		**8.5 – 10.5**	0.15	0.05	**0.35 – 0.6**	**0.06**	0.07	0.15	**0.1 – 0.3 Mo** **0.1 – 0.3 Zr**
Castasil-21	AlSi9Sr		**8.0 – 9.0**	**0.5 – 0.7**	0.02	**0.01**	0.03	0.07	**0.01**	**Sr**
Unifont-90	AlZn10Si8Mg	71 100	**8.5 – 9.3**	0.15	0.03	0.10	**0.3 – 0.5**	**9.0 – 10.0**	0.15	**(Na/Sr)**
Unifont-94	AlZn10Si8Mg		**8.5 – 9.5**	**0.4**	0.03	**0.4**	**0.3 – 0.5**	**9.0 – 10.0**	0.10	
Castadur-30	AlZn3Mg3Cr		0.15	0.2	0.05	**0.1 – 0.2**	**2.5 – 3.0**	**2.2 – 2.8**	**0.15**	**0.2 – 0.4 Cr; Be**
Castadur-50	AlZn5Mg		0.15	0.2	0.05	**0.1 – 0.2**	**0.4 – 0.8**	**4.9 – 5.8**	**0.15**	**0.2 – 0.4 Cr**
Peraluman-30	AlMg3	51 100	0.45	0.15	0.02	**0.01 – 0.4**	**2.7 – 3.5**	0.10	**0.01 – 0.15**	**Be**
Peraluman-36	AlMg3Si		**0.9 – 1.3**	0.15	0.02	**0.01 – 0.4**	**2.7 – 3.5**	0.10	**0.01 – 0.15**	**Be**
Peraluman-50	AlMg5	51 300	0.30	0.15	0.02	**0.01 – 0.4**	**4.8 – 5.5**	0.10	**0.01 – 0.15**	**Be**
Peraluman-56	AlMg5Si	51 400	**0.9 – 1.3**	0.15	0.02	**0.01 – 0.4**	**4.8 – 5.5**	0.10	**0.01 – 0.15**	**Be**
Magsimal-59	AlMg5Si2Mn	51 500	**1.8 – 2.6**	0.20	0.03	**0.5 – 0.8**	**5.0 – 6.0**	0.07	0.20	**Be; V**
Alufont-47	AlCu4TiMg	21 000	0.15	0.15	**4.2 – 5.0**	0.10	**0.20 – 0.35**	0.07	**0.15 – 0.25**	
Alufont-48	AlCu4TiMgAg		0.05	0.10	**4.0 – 5.0**	**0.01 – 0.5**	**0.15 – 0.35**	0.05	**0.15 – 0.35**	**0.4 – 1.0 Ag**
Alufont-52	AlCu4Ti	21 100	0.15	0.15	**4.2 – 5.2**	**0.01 – 0.5**	0.03	0.07	**0.15 – 0.25**	
Alufont-60	AlCu5NiCoSbZr		0.20	0.30	**4.5 – 5.2**	**0.1 – 0.3**	0.10	0.10	**0.15 – 0.30**	**1.3 – 1.7 Ni** **0.10 – 0.40 Co** **0.10 – 0.30 Zr & Sb**
Thermodur-72	AlMg7Si3Mn		**3.0 – 3.8**	0.15	0.05	**0.5 – 0.8**	**7.0 – 8.0**	0.10	0.20	**Be; V**
Thermodur-73	AlSi11Cu2Ni2Mg2Mn		**10.0 – 11.8**	0.15	**1.8 – 2.3**	**0.4**	**1.8 – 2.3**	0.10	0.10	**1.8 – 2.3 Ni; Sr**
Rotoren-Al 99.7	Al99.7-E		**0.20**	**0.25**	0.01	0.02	0.02	0.07	0.02	**Mn+Ti+V+Cr≤0.02%**
Aluman-16	AlMn1.6		0.15	**0.2 – 0.9**	0.03	**1.4 – 1.6**	0.05	0.10	0.15	

Physical properties

The details of physical properties relate to heat-treatable alloys in a heat-treated state. They are heavily influenced by fluctuations in the alloy composition and the microstructure state. This explains why some of the measurement ranges are so large.

The details for the melt and solidification ranges take into account the initial signs of partial melting resulting from segregation in the cast structure, which may occur in particular when heating up quickly at far below the theoretical equilibrium temperature.

Density (approximate value)	Young's modulus	Linear thermal expansion coeffizient 20–200 °C	Thermal conductivity 20–200 °C	Electrical conductivity		Linear shrinkage			Melt and solidification range
						Sand casting	Gravity die casting	High pressure die casting	
kg/dm³	GPa	$\frac{1}{K} \times 10^{-6}$	$\frac{W}{K \times cm}$	MS/m or m/(Ω × mm²)	% IACS	%	%	%	°C
2.67	66–73	23	2.0	29–31.5	50.0–54.0	1.1–1.2	0.8–1.1	0.5–1.0	600–650
2.67	65–75	23	1.5	21–26	36.0–45.0	1.1–1.2	0.8–1.1		550–625
2.66	69–75	22	1.6	21–27	36.0–46.5	1.1–1.2	0.8–1.1		550–625
2.66	69–75	22	1.6	21–27	36.0–46.5	1.1–1.2	0.8–1.1		550–625
2.66	69–75	22	1.8	27–29	46.5–50.0	1.1–1.2	0.8–1.1		550–625
2.66	71–75	22	1.5	20–26	34.5–45.0	1.1–1.2	0.8–1.1		550–625
2.65	74–83	21	1.5	21–26	36.0–45.0	1.0–1.1	0.7–1.0		550–600
2.64	74–83	21	1.5	21–26	36.0–45.0			0.4–0.6	550–590
2.67	74–83	21	1.4	21–22	36.0–38.0			0.4–0.6	550–585
2.65	62–78	21	1.4	18–24	31.0–41.5			0.4–0.6	550–595
2.64	65–81	21	1.4	17–27	29.5–46.5	1.0–1.1	0.7–1.0		565–585
2.64	76–83	21	1.4	18–26	31.0–45.0	1.0–1.1	0.7–1.0		565–585
2.68	77–83	21	1.2	16–22	27.5–38.0	1.0–1.1	0.7–1.0	0.4–0.6	545–600
2.73	77–83	18	1.1	14–17	24.0–29.5	0.6–0.8	0.4–0.6	0.3–0.5	510–650
2.64	74–83	21	1.4	21–26	36.0–45.0			0.4–0.6	550–590
2.69	68–75	21	1.3	18–22	31.0–38.0			0.4–0.6	550–600
2.65	62–78	21	1.7	25–28	43.0–48.5			0.4–0.6	550–595
2.85	74–80	21	1.2	16–20	27.5–34.5	1.1–1.2	0.8–1.1		550–595
2.85	74–80	21	1.2	16–20	27.5–34.5			0.5–0.8	550–595
2.74	70–72	24	1.2	17–20	29.5–34.5	1.0–1.4	0.7–1.1		555–650
2.78	71–74	24	1.3	18–21	31.0–36.0	1.0–1.4			555–655
2.66	63–73	24	1.3	16–23	27.5–39.5	1.1–1.5	0.8–1.2		560–650
2.66	66–74	24	1.2	15–23	26.0–39.5	1.1–1.5	0.8–1.2		560–650
2.63	63–73	24	1.2	15–21	26.0–36.0	1.0–1.4	0.7–1.1		545–645
2.63	68–75	24	1.1	14–21	24.0–36.0	1.0–1.4	0.7–1.1		545–645
2.63	70–80	24	1.1	14–16	24.0–27.5			0.6–1.1	580–620
2.75	65–72	23	1.3	17–23	29.5–39.5	1.3–1.5	0.8–1.2		540–650
2.79	65–72	23	1.3	17–23	29.5–39.5	1.3–1.5	0.8–1.2		525–645
2.75	65–73	23	1.3	17–23	29.5–39.5	1.3–1.5	0.8–1.2		540–650
2.84	72–76	22.5	1.2	17–21	29.5–36.0	1.3–1.5			545–650
2.61	75–85						0.7–1.2	0.6–1.1	
2.74	85–90					1.0–1.1	0.7–1.0	0.4–0.6	
2.67	65–70	24	2.3	34.5–36.5	59.5–63.0	1.5–1.8		1.0–1.4	655–660
2.73	65–72	24	1.5	20–26	34.5–45.0	1.2–1.5		0.8–1.2	645–660

Thermal treatment

Castings cooled in permanent molds take the shortest annealing time. Those cooled in sand take the longest. For AlCu alloys, the annealing time figures apply to castings with wall thickness to 8 mm. Castings with thicker walls should be annealed at temperatures 10 °C lower for 12–18 hours.

Treatment state

F	as-cast state	**T5**	quenched and artificially aged
O	annealed	**T6**	artificially aged
T1	self-aged	**T64**	partially aged
T4	naturally aged	**T7**	overaged
T5	stabilised		

Alloy	**Chemical denomination**	State	Solution heat treatment temperature **°C**	Solution heat treatment duration **h**	Quenching water temperature **°C**	Ageing temperature **°C**	Ageing duration **h**
Anticorodal-04	AlSi0.5Mg	T6	520–530	6–8	20	180–190	6–8
		T7	520–530	6–8	20	220–240	4–6
Anticorodal-50	AlSi5Mg	T6	520–535	4–8	20	155–160	7–9
		T4	520–535	4–8	20	15–30	120
Anticorodal-70	AlSi7Mg0.3	T6	520–545	4–10	20	155–165	6–8
		T64	520–545	4–10	20	150–160	2–3
Anticorodal-78dv	AlSi7Mg0.3	T6	520–545	4–20	20	145–160	2–15
Anticorodal-71	AlSi7Mg0.3-E	T6	520–545	4–8	20	155–165	6–8
		T7	520–545	4–8	20	200–230	6–8
Anticorodal-72	AlSi7Mg0.6	T6	520–545	4–10	20	155–165	6–8
		T64	520–545	4–10	20	150–160	2–3
Silafont-30	AlSi9Mg	T6	520–535	6–10	20	160–170	6–8
		T5	–	–	Air	210–230	6–8
Silafont-36	AlSi10MnMg	T6	480–490	2–5	20/Air	155–170	2–6
		T7	480–490	1–5	20/Air	190–230	1–3
		T4	480–490	2–5	20/Air	15–30	120
		T5	–	–	20	155–190	2–5
Silafont-38	AlSi9MnMgZn	T6	470–490	1–3	Water	155–190	1–3
		T6	470–490	1–3	Air	155–210	1–3
Silafont-13	AlSi11	O	520–530	6–8	20	–	–
Silafont-20	AlSi11Mg	T6	520–535	6–10	20	130–170	6–8
		T5	–	–	Air	210–230	5–8
Silafont-70	AlSi12CuNiMg	T6	520–530	5–10	20–80	165–185	5–8
		T5	–	–	Air	210–220	10–12
Castaman-35	AlSi10MnMg	T6	480–490	2–5	20/Air	155–170	2–6
Castasil-21	AlSi9Sr	O	345–355	1–2	Air	–	–
Alufont-47	AlCu4TiMg	T4	520–530	8–16	20–80	15–30	120
Alufont-48	AlCu4TiMgAg	T6	525–530	8–16	20–80	160–180	6–7
Alufont-52	AlCu4Ti	T6	525–535	8–16	20–50	160–175	6–7
		T64	525–535	8–10	20–50	135–145	6–7
Alufont–60	AlCu5NiCoSbZr	T7	535–545	10–15	80	210–220	12–16
		O	345–355	5–10	Air	–	–
Thermodur–73	AlSi11Cu2Ni2Mg2Mn	T5	–	–	Air	210–270	10–12

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Solutions thru Innovation

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