ALCAST TECHNOLOGIES

Aluminium casting alloy chart: composition

21 grades across JIS, BS, ASTM and EN standards

Alloy	Standard	Main process	Si	Fe	Cu	Mn	Mg	Ni	Zn	Other
JAPAN, JIS H 5302 (DIE CASTING)										
ADC12	JIS H 5302	HPDC	9.6 to 12.0	≤ 1.3	1.5 to 3.5	≤ 0.5	≤ 0.3	≤ 0.5	≤ 1.0	Sn ≤ 0.2
ADC10	JIS H 5302	HPDC	7.5 to 9.5	≤ 1.3	2.0 to 4.0	≤ 0.5	≤ 0.3	≤ 0.5	≤ 1.0	Sn ≤ 0.2
ADC1	JIS H 5302	HPDC	11.0 to 13.0	≤ 1.3	≤ 1.0	≤ 0.3	≤ 0.3	≤ 0.5	≤ 0.5	Sn ≤ 0.1
ADC3	JIS H 5302	HPDC	9.0 to 11.0	≤ 1.3	≤ 0.6	≤ 0.3	0.4 to 0.6	≤ 0.5	≤ 0.5	Sn ≤ 0.1
UK AND INDIA, BS 1490 (LM SERIES)										
LM24	BS 1490	HPDC	7.5 to 9.5	≤ 1.3	3.0 to 4.0	≤ 0.5	≤ 0.3	≤ 0.5	≤ 3.0	Pb ≤ 0.3, Sn ≤ 0.2
LM2	BS 1490	HPDC	9.0 to 11.5	≤ 1.0	0.7 to 2.5	≤ 0.5	≤ 0.3	≤ 0.5	≤ 2.0	
LM20	BS 1490	HPDC	10.0 to 13.0	≤ 1.0	≤ 0.4	≤ 0.5	≤ 0.2	≤ 0.1	≤ 0.2	Ti ≤ 0.2
LM6	BS 1490	Gravity, HPDC	10.0 to 13.0	≤ 0.6	≤ 0.1	≤ 0.5	≤ 0.1	≤ 0.1	≤ 0.1	Ti ≤ 0.2
LM9	BS 1490	Gravity, HPDC	10.0 to 13.0	≤ 0.6	≤ 0.2	0.3 to 0.7	0.2 to 0.6	≤ 0.1	≤ 0.1	Ti ≤ 0.2
LM13	BS 1490	Gravity, HPDC	10.0 to 12.0	≤ 1.0	0.7 to 1.5	≤ 0.5	0.8 to 1.5	≤ 1.5	≤ 0.5	
LM25	BS 1490	Gravity	6.5 to 7.5	≤ 0.5	≤ 0.2	≤ 0.3	0.2 to 0.6	≤ 0.1	≤ 0.1	Ti ≤ 0.2
LM4	BS 1490	Gravity	4.0 to 6.0	≤ 0.8	2.0 to 4.0	0.2 to 0.6	≤ 0.15	≤ 0.3	≤ 0.5	
USA, ALUMINUM ASSOCIATION / ASTM										
A380	ASTM B85	HPDC	7.5 to 9.5	≤ 1.3	3.0 to 4.0	≤ 0.50	≤ 0.10	≤ 0.50	≤ 3.0	Sn ≤ 0.35
383	ASTM B85	HPDC	9.5 to 11.5	≤ 1.3	2.0 to 3.0	≤ 0.50	≤ 0.10	≤ 0.30	≤ 3.0	Sn ≤ 0.15
A413	ASTM B85	HPDC	11.0 to 13.0	≤ 1.3	≤ 1.0	≤ 0.35	≤ 0.10	≤ 0.50	≤ 0.50	Sn ≤ 0.15
A360	ASTM B85	HPDC	9.0 to 10.0	≤ 1.3	≤ 0.6	≤ 0.35	0.40 to 0.6	≤ 0.50	≤ 0.50	Sn ≤ 0.15
A356.0	ASTM B26 / B108	Gravity, sand	6.5 to 7.5	≤ 0.20	≤ 0.20	≤ 0.10	0.25 to 0.45		≤ 0.10	Ti ≤ 0.20
EUROPE, EN 1706										
EN AC-46000	EN 1706	HPDC	8.0 to 11.0	≤ 1.3	2.0 to 4.0	≤ 0.55	0.05 to 0.55	≤ 0.55	≤ 1.2	Sn ≤ 0.25
EN AC-46500	EN 1706	HPDC	8.0 to 11.0	≤ 1.3	2.0 to 4.0	≤ 0.55	0.05 to 0.55	≤ 0.55	≤ 3.0	Sn ≤ 0.25
EN AC-44300	EN 1706	HPDC	10.5 to 13.5	≤ 1.0	≤ 0.10	≤ 0.55			≤ 0.15	
EN AC-42100	EN 1706	Gravity, sand	6.5 to 7.5	≤ 0.19	≤ 0.05	≤ 0.10	0.25 to 0.45		≤ 0.07	Ti 0.08 to 0.25

Main alloying elements in weight percent, aluminium remainder. Single values are maximums. Summarised from JIS H 5302, BS 1490, ASTM B85, B26 / B108 and EN 1706; other elements and limits apply, and ingot specifications differ slightly from casting specifications. Always check the current edition of the standard named on your drawing. Blank cells: not specified in this summary.

Aluminium casting alloy chart: equivalents and selection

Families, equivalents, heat treatment and typical uses

Alloy	Family	Nearest equivalents	Heat treatable	Character	Typical uses
ADC12	Al Si11 Cu2 family	383, EN AC-46100, LM2 (nearest)	No (as cast)	Excellent castability, good machinability	General housings, covers, brackets
ADC10 / A380 / LM24	AlSi9Cu3(Fe)(Zn)	EN AC-46500	No (as cast)	Strength and machinability, tolerant of impurities	Industrial housings, gearbox and motor parts
LM2	Al Si10 Cu2 family	ADC12, 383 (nearest)	No	Good fluidity, general purpose	Covers, housings, non critical parts
LM20 / A413 / ADC1	AlSi12(Fe)	EN AC-44300	No	High fluidity, pressure tightness	Thin walls, pressure tight parts
LM6	AlSi12	EN AC-44100, A413 (nearest)	No	Outstanding corrosion resistance and fluidity	Marine, water contact, intricate parts
LM9 / A360 / ADC3	AlSi10Mg	EN AC-43400 (HPDC use)	Yes	Strength with corrosion resistance	Stressed, corrosion exposed parts
LM13	AlSi12CuNiMg	EN AC-48000, 336 (nearest), AC8A	Yes	Low thermal expansion, wear resistance	Pistons, hot running parts
LM25 / A356	AlSi7Mg	EN AC-42000 and 42100, AC4C	Yes (T6 / TF)	Strength and ductility after T6	Structural, safety critical gravity castings
LM4	AlSi5Cu3	EN AC-45000 (nearest), 319	Yes	General engineering, machines well	General gravity castings
EN AC-46000	AlSi9Cu3(Fe)	A380, ADC10 (nearest)	No	The common European HPDC alloy	Automotive and industrial housings

Temper (AA)	BS 1490	Meaning	Typical for
F	M	As cast	Most HPDC parts
T5	TE	Artificially aged only	HPDC parts needing stability or a little extra strength
T6	TF	Solution treated, quenched, artificially aged	LM25 / A356 structural gravity castings
T7	TF7 type	Solution treated and over aged	Vacuum HPDC structural parts (AlSi10MnMg family)

“Equivalent” means the nearest commonly accepted match, not an identical specification: compare iron, copper and zinc limits before substituting. Conventional HPDC parts are not solution treated because entrapped gas causes blisters. Guides: alcasttech.in/alloys and alcasttech.in/insights/heat-treatment-of-aluminium-castings