



**Table 1. Chemical composition guidelines and comparisons of some aluminum alloy sand and permanent mold castings**

Cross index								Chemical composition									
KS	JIS	ASTM	AA	DIN	BS	IS	GB	Cu	Zn	Mn	Ni	Pb	Sn	Fe	Si	Mg	Ti
AC1A	AC1A	C4A (A02950)	295.0	G(GK)- AlCu4Ti	-	-	ZLD 203	4.0 ~ 5.0	≤ 0.30 (0.2) <sup>2</sup>	≤ 0.35 (0.1) <sup>2</sup>	≤ 0.05 (-) <sup>2</sup>	≤ 0.05	≤ 0.05 (0.01) <sup>2</sup>	≤ 0.50 (0.6) <sup>2</sup>	≤ 1.2	≤ 0.15 (0.03) <sup>2</sup>	≤ 0.25 (0.20) <sup>2</sup>
AC1B	AC1B	(A0.2040)	204.0	G(GK)- AlCu4TiMg	-	2280		4.0 ~ 5.0	≤ 0.10	≤ 0.10	≤ 0.05 (0.1) <sup>1</sup>	≤ 0.05	≤ 0.05	≤ 0.35	≤ 0.20	0.15 ~ 0.35	0.05 ~ 0.30
							ZLD 201	4.5~5.3	≤ 0.2	0.6~1.0	≤ 0.1	-	-	≤ 0.20	≤ 0.3	≤ 0.05	0.15 ~ 0.35
							ZLD 201A	4.8~5.3	≤ 0.1	0.6~1.0	≤ 0.05	-	-	≤ 0.10	≤ 0.05	≤ 0.05	0.15 ~ 0.35
AC2A	AC2A	-	-	-	-	4223 A		3.0~4.5 (2.8~3.8) <sup>1</sup>	≤ 0.55 (0.15) <sup>1</sup>	≤ 0.55 (0.2~0.6) <sup>1</sup>	≤ 0.30 (0.2) <sup>1</sup>	≤ 0.15 (0.1) <sup>1</sup>	≤ 0.05	≤ 0.8 (0.6) <sup>1</sup>	4.0~6.0	≤ 0.25 (0.5) <sup>1</sup>	≤ 0.20
AC2B	AC2B	SC64D (A03190)	319.0	-	LM-4	4223	ZLD 107	2.0~4.0 (3.5~4.5) <sup>2</sup>	≤ 0.5 (0.2) <sup>2</sup>	≤ 0.50 (0.2~0.6) <sup>1</sup> (0.3) <sup>2</sup>	≤ 0.35 (0.2) <sup>1</sup> (-) <sup>2</sup>	≤ 0.20 (0.1) <sup>1</sup> (0.05) <sup>2</sup>	≤ 0.10 (0.01) <sup>2</sup>	≤ 0.10 (0.8) <sup>1</sup> (0.4) <sup>2</sup>	5.0~7.0 (4.0~6.0) <sup>1</sup> (6.5~7.5) <sup>2</sup>	≤ 0.50 (0.15) <sup>1</sup> (0.05) <sup>2</sup>	≤ 0.20 (-) <sup>2</sup>
							ZLD 107	5.0~8.0	≤ 0.5	≤ 0.5	≤ 0.3	≤ 0.05	≤ 0.01	≤ 0.5	4.0~6.0	0.3~0.55	-
AC3A	AC3A	-	-	G(GK)- AlSi12 (3.2581)	LM-6	-	ZLD 102	≤ 0.25 (0.30) <sup>2</sup>	≤ 0.30 (0.1) <sup>2</sup>	≤ 0.35 (0.5) <sup>2</sup>	≤ 0.10 (-) <sup>2</sup>	≤ 0.10 (-) <sup>2</sup>	≤ 0.10 (-) <sup>2</sup>	≤ 0.8 (0.6) <sup>2</sup>	10.0~13.0	≤ 0.15 (0.10) <sup>2</sup>	≤ 0.20
AC4A	AC4A	-	-	G(GK)- AlSi10Mg (3.2581)	-	4635	ZLD 104	≤ 0.25 (0.1) <sup>1</sup> (0.1) <sup>2</sup>	≤ .25 (0.1) <sup>1</sup>	0.30~0.6 (0.3~0.7) <sup>1</sup> (0.2~0.5) <sup>2</sup>	≤ 0.10 (-) <sup>2</sup>	≤ 0.10 (0.05) <sup>2</sup>	≤ 0.05 (0.01)	≤ 0.55 (0.6) <sup>1</sup> (0.45) <sup>2</sup>	8.0~10.0 (10.0~13.0) <sup>1</sup> (8.0~10.5) <sup>2</sup>	0.30~0.6 (0.2~0.6) <sup>1</sup> (0.2~0.4) <sup>2</sup>	≤ 0.20 (-) <sup>2</sup>
							ZLD 111	1.3~1.8	≤ 0.1	0.10~0.35	-	≤ 0.05	≤ 0.01	≤ 0.35	8.0~10.0	0.45~0.65	-
AC4B	AC4B	SC94 (A03330)	333.0	G(GK)- AlSi8Cu3 (3.2161)	-	-		2.0~4.0	≤ 1.0	≤ 0.50	≤ 0.35	≤ 0.20	≤ 0.10	≤ 1.0	7.0~10.0	≤ 0.50	≤ 0.20

Table 1. (Continued)

Cross Index								Chemical composition									
KS	JIS	ASTM	AA	DIN	BS	IS	GB	Cu	Zn	Mn	Ni	Pb	Sn	Fe	Si	Mg	Ti
AC4C	AC4C	SG70A (A03560)	356.0	—	LM-25	4450	ZLD 101	≤ 0.25 (0.1) <sup>1</sup> (0.2) <sup>2</sup>	≤ 0.35 (0.1) <sup>1</sup> (0.2) <sup>2</sup>	≤ 0.35 (0.3) <sup>1</sup>	≤ 0.10 (-) <sup>2</sup>	≤ 0.10 (0.05) <sup>2</sup>	≤ 0.05 (0.01) <sup>2</sup>	≤ 0.55 (0.5) <sup>1</sup> (0.45) <sup>2</sup>	6.5~7.5	0.25~0.45 (0.20~0.45) <sup>1</sup> (0.30~0.50) <sup>2</sup>	≤ 0.20
AC4CH	AC4CH	SG70B (A13560)	A356.0	G(GK)- AlSi7Mg (3.2371)	—	—	ZLD 101A	≤ 0.20 (0.10) <sup>2</sup>	≤ 0.10 (0.05) <sup>2</sup>	≤ 0.10 (0.05) <sup>2</sup>	≤ 0.05	≤ 0.05	≤ 0.05 (0.01) <sup>2</sup>	≤ 0.20 (0.12) <sup>2</sup>	6.5~7.5	0.20~0.40 (0.30~0.50) <sup>2</sup>	≤ 0.20 (0.08~0.20) <sup>2</sup>
—	—	357.0	357.0	—	—	—	ZLD 116	≤ 0.05 (0.3) <sup>2</sup>	≤ 0.05 (0.3) <sup>2</sup>	≤ 0.03 (0.1) <sup>2</sup>	—	— (0.05) <sup>2</sup>	— (0.01) <sup>2</sup>	≤ 0.15 (0.5) <sup>2</sup>	6.5~7.5 (6.5~8.5) <sup>2</sup>	0.45~0.6 (0.4~0.6) <sup>2</sup>	≤ 0.20 (-) <sup>2</sup>
—	—	A357.0 (A13570)	A357.0	—	—	—	ZLD 114A	≤ 0.20 (-) <sup>2</sup>	≤ 0.10 (-) <sup>2</sup>	≤ 0.10	—	—	—	≤ 0.20 (0.15) <sup>2</sup>	6.5~7.5	0.45~0.7 (0.50~0.65) <sup>2</sup>	≤ 0.04~0.20 (-) <sup>2</sup>
AC4D	AC4D	SC51A (A03551)	355.0	—	LM-16	4225	ZLD 105	1.0~1.5	≤ 0.30 (0.5) <sup>1</sup>	≤ 0.50	≤ 0.20 (0.3) <sup>1</sup> (-) <sup>2</sup>	≤ 0.10 (0.2) <sup>1</sup> (0.05) <sup>2</sup>	≤ 0.05 (0.1) <sup>1</sup> (0.01) <sup>2</sup>	≤ 0.6 (0.8) <sup>1</sup> (0.45) <sup>2</sup>	4.5~5.5 (4.5~6.0) <sup>1</sup>	0.40~0.6 (0.3~0.6) <sup>1</sup> (0.45~0.65) <sup>2</sup>	≤ 0.20 (-) <sup>2</sup>
							ZLD 105A	1.0~1.5	≤ 0.10	—	—	≤ 0.05	≤ 0.01	≤ 0.15	4.5~5.5	0.50~0.65	—
							ZLD 106	1.0~1.5	≤ 0.20	—	—	≤ 0.05	≤ 0.01	≤ 0.5	7.5~8.5	0.35~0.55	—
AC5A	AC5A	CN42A (A02420)	242.0	—	—	2285		3.5~4.5	≤ 0.15 (0.1) <sup>1</sup>	≤ 0.35 (0.6) <sup>1</sup>	1.7~2.3	≤ 0.05	≤ 0.05	≤ 0.8 (0.7) <sup>1</sup>	≤ 0.6 (0.7) <sup>1</sup>	1.2~1.8	≤ 0.20
AC7A	AC7A	G4A (A05140)	514.0	G-AMg5 (3.3561)	LM-5	5230	ZLD 303	≤ 0.10	≤ 0.15 (0.1) <sup>1</sup> (0.2) <sup>2</sup>	≤ 0.6 (0.3~0.7) (0.2) <sup>2</sup>	≤ 0.05 (0.1) <sup>1</sup> (-) <sup>2</sup>	≤ 0.05 (-) <sup>2</sup>	≤ 0.05 (-) <sup>2</sup>	≤ 0.30 (0.6) <sup>1</sup> (0.45) <sup>2</sup>	≤ 0.20 (0.3) <sup>1</sup> (0.8~1.3) <sup>2</sup>	3.5~5.5 (3.0~6.0) <sup>1</sup> (4.6~5.6) <sup>2</sup>	≤ 0.20
							ZLD 305	≤ 0.10	—	≤ 0.10	—	—	—	≤ 0.25	≤ 0.20	7.6~9.0	—
AC7B	AC7B	G10A (A05200)	520.0	G-AMg10 (3.3591)	LM-10	5500	ZLD 301	≤ 0.10	≤ 0.10 (0.15) <sup>2</sup>	≤ 0.10 (0.15) <sup>2</sup>	≤ 0.05 (0.1) <sup>1</sup> (0.05) <sup>2</sup>	≤ 0.05	≤ 0.05	≤ 0.30 (0.4) <sup>1</sup> (0.25) <sup>2</sup>	≤ 0.20 (0.25) <sup>1</sup>	9.5~11.0	≤ 0.20
AC8A	AC8A	SN112A (A03360)	336.0	—	LM-13	4652	ZLD 109	0.8~1.3 (0.7~1.5) <sup>1</sup> (0.5~1.5) <sup>2</sup>	≤ 0.15 (0.5) <sup>1</sup> (0.2) <sup>2</sup>	≤ 0.15 (0.5) <sup>1</sup> (0.2) <sup>2</sup>	0.8~1.5 (0.7~1.5) <sup>1</sup> (-) <sup>2</sup>	≤ 0.05 (0.1) <sup>1</sup>	≤ 0.05 (0.1) <sup>1</sup> (0.01) <sup>2</sup>	≤ 0.8 (1.0) <sup>1</sup> (0.4) <sup>2</sup>	11.0~13.0 (10.0~12.0) <sup>1</sup>	0.7~1.3 (0.8~1.5) <sup>1</sup> (0.9~1.4) <sup>2</sup>	≤ 0.20
AC8B	AC8B	SC103A (A03320)	332.0	—	LM-26	4525		2.0~4.0	≤ 0.50 (1.0) <sup>1</sup>	≤ 0.50	0.10~1.0 (1.0) <sup>1</sup>	≤ 0.10 (0.3) <sup>1</sup>	≤ 0.10	≤ 1.0 (1.2) <sup>1</sup>	8.5~10.5	0.50~1.5	≤ 0.20
AC8C	AC8C	SC103A (A03320)	332.0	—	—	—	ZLD 108	2.0~4.0 (1.0~2.0) <sup>2</sup>	≤ 0.50 (0.2) <sup>2</sup>	≤ 0.50 (0.3~0.9) <sup>2</sup>	≤ 0.50 (0.3) <sup>2</sup>	≤ 0.10 (0.05) <sup>2</sup>	≤ 0.10 (0.01) <sup>2</sup>	≤ 1.0 (0.4) <sup>2</sup>	8.5~10.5 (11.0~13.0) <sup>2</sup>	0.50~1.5 (0.5~1.0) <sup>2</sup>	≤ 0.20
AC9A	AC9A	—	—	—	LM-29	—		0.50~1.5	≤ 0.20	≤ 0.50	0.50~1.5	≤ 0.10	≤ 0.10	≤ 0.8	22~24	0.50~1.5	≤ 0.20

Table 1. (Continued)

Cross Index								Chemical composition									
KS	JIS	ASTM	AA	DIN	BS	IS	GB	Cu	Zn	Mn	Ni	Pb	Sn	Fe	Si	Mg	Ti
AC9B	AC9B	-	-	-	-	-	ZLD 118	0.50~1.5 (1.0~2.0) <sup>2</sup>	≤ 0.20 (0.1) <sup>2</sup>	≤ 0.50 (0.3~0.5) <sup>2</sup>	0.50~1.5 (-) <sup>2</sup>	≤ 0.10 (0.05) <sup>2</sup>	≤ 0.10	≤ 0.8 (0.5) <sup>2</sup>	18~20 (19~22) <sup>2</sup>	0.50~1.5 (0.5~0.8) <sup>2</sup>	≤ 0.20
							ZLD 115	≤ 0.10	-	≤ 0.10	-	≤ 0.05	≤ 0.01	≤ 0.25	4.8~6.2	0.45~0.7	-
							ZLD 204A	4.6~5.3	≤ 0.10	-	-	-	-	≤ 0.13	≤ 0.05	≤ 0.05	-
							ZLD 205A	4.6~5.3	≤ 0.10	-	-	-	-	≤ 0.10	≤ 0.05	≤ 0.05	-
							ZLD 207	3.0~3.4	≤ 0.20	0.9~1.2	-	-	-	≤ 0.50	1.6~2.0	0.2~0.3	-
							ZLD 401	≤ 0.60	9.2~13.0	≤ 0.50	-	-	-	≤ 0.60	6.0~8.0	-	-
							ZLD 402	≤ 0.25	5.2~6.5	≤ 0.1	-	-	-	≤ 0.4	≤ 0.3	-	-
							ZLD 501	-	-	-	-	-	-	≤ 0.3	≤ 0.20	-	≤ 0.15

Notes:

- ( )<sup>1</sup> - IS standard, ( )<sup>2</sup> - GB standard
- Other contents  
 ZLD204A : Cd(0.15~0.25)/ ZLD205A : Zr(0.05~0.20), Cd(0.15~0.25), B(0.01~0.06), V(0.05~0.30)  
 ZLD207 : Ni(0.2~0.3), Zr(0.15~0.25), RE(4.5~5.0) / ZLD115 : Sb(0.1~0.25)  
 ZLD116 : Be(0.15~0.40) / ZLD118 : RE(0.6~1.5) / ZLD305 : Be(0.03~0.1) / ZLD402 : Cr(0.4~0.6)



**Table 2. Chemical composition guidelines and comparisons of some aluminum alloy die castings**

Cross index								Chemical composition									
KS	JIS	ASTM	AA	DIN	BS	IS	GB	Cu	Zn	Mn	Ni	Pb	Sn	Fe	Si	Mg	Ti
ALDC1	ADC1	S12A (A14130)	A413.0	GD-ALSi12(Cu) (3.2582)	LM-20	4600		≤ 1.0 (0.1) <sup>1</sup>	≤ 0.5 (0.1) <sup>1</sup>	≤ 0.3 (0.5) <sup>1</sup>	≤ 0.5 (0.1) <sup>1</sup>	- (0.1) <sup>1</sup>	≤ 0.1 (0.05) <sup>1</sup>	≤ 1.3 (0.6) <sup>1</sup>	11.0~13.0 (10.0~13.0) <sup>1</sup>	≤ 0.3 (0.1) <sup>1</sup>	- (0.2) <sup>1</sup>
-	-	-	-	-	-	4600A	YLD 102	≤ 0.4 (0.30) <sup>2</sup>	≤ 0.20 (0.1) <sup>2</sup>	≤ 0.5 (0.4) <sup>2</sup>	≤ 0.10 (-) <sup>2</sup>	≤ 0.10 (-) <sup>2</sup>	(0.1) <sup>1</sup> (-) <sup>2</sup>	≤ 1.0 (0.9)	10.0~13.0	≤ 0.2 (0.25)	≤ 0.20 (-) <sup>2</sup>
ALDC2	ADC3	SG100A (A13600)	A360.0	GD-ALSi10Mg(Cu) (3.2983)	-	-	YLD 104	≤ 0.6 (-) <sup>2</sup>	≤ 0.5 (-) <sup>2</sup>	≤ 0.3 (-) <sup>2</sup>	≤ 0.5 (-) <sup>2</sup>	- (0.05) <sup>2</sup>	≤ 0.1 (0.01) <sup>2</sup>	≤ 1.3 (0.8) <sup>2</sup>	9.0~10.0 (8.0~10.5) <sup>2</sup>	0.4~0.6 (0.2~0.35) <sup>2</sup>	- (0.15) <sup>2</sup>
ALDC3	ADC5	G8A (A05180)	518.0	-	-	-	YLD 302	≤ 0.2 (0.1) <sup>2</sup>	≤ 0.1 (0.2) <sup>2</sup>	≤ 0.3 (-) <sup>2</sup>	≤ 0.1 (-) <sup>2</sup>	-	≤ 0.1 (-) <sup>2</sup>	≤ 1.8 (0.9) <sup>2</sup>	≤ 0.3 (0.8~1.3) <sup>2</sup>	4.0~8.5 (4.6~5.5) <sup>2</sup>	-
ALDC4	ADC6	-	515.0	-	-	-	YLD 306	≤ 0.1	≤ 0.4	0.4~0.6 (-) <sup>2</sup>	≤ 0.1	-	≤ 0.1	≤ 0.8 (0.6) <sup>2</sup>	≤ 1.0	2.5~4.0 (2.6~4.0) <sup>2</sup>	-
ALDC7	ADC10	-	B380.0	GD-ALSi8Cu3 (3.2162)	-	-	YLD 112	2.0~4.0 (2.5~4.0) <sup>2</sup>	≤ 1.0	≤ 0.5 (0.3) <sup>2</sup>	≤ 0.5	- (0.3) <sup>2</sup>	≤ 0.3 (0.2) <sup>2</sup>	≤ 1.3 (0.9) <sup>2</sup>	7.5~9.5	≤ 0.3	- (0.2) <sup>2</sup>
ALDC7Z	ADC10Z	SC84A (A13800)	A380.0	-	LM-24	4420		2.0~4.0 (3.0~4.0) <sup>1</sup>	≤ 3.0	≤ 0.5	≤ 0.5	- (0.3) <sup>1</sup>	≤ 0.3 (0.2) <sup>1</sup>	≤ 1.3	7.5~9.5	≤ 0.3	(0.2) <sup>1</sup>
ALDC8	ADC12	-	383.0	-	-	-	YLD 113	1.5~3.5 (2.0~3.5) <sup>2</sup>	≤ 1.0 (0.8) <sup>2</sup>	≤ 0.5	≤ 0.5	-	≤ 0.3 (0.2) <sup>2</sup>	≤ 1.3 (0.9) <sup>2</sup>	9.6~12.0	≤ 0.3	-
ALDC8Z	ADC12Z	SC102A (A03830)	A380.0	-	LM-2	4520		1.5~3.5 (0.7~2.5) <sup>1</sup>	≤ 3.0 (2.0) <sup>1</sup>	≤ 0.5	≤ 0.5	- (0.3) <sup>1</sup>	≤ 0.3 (0.2) <sup>1</sup>	≤ 1.3 (1.0) <sup>1</sup>	9.6~12.0 (9.0~11.5) <sup>1</sup>	≤ 0.3	(0.2) <sup>1</sup>
ALDC9	ADC14	SC174B (A23900)	B390.0	-	-	IS	YLD 117	4.0~5.0	≤ 1.5	≤ 0.5	≤ 0.3	-	≤ 0.3	≤ 1.3 (0.9) <sup>2</sup>	16.0~18.0	0.45~0.65 (0.50~0.65) <sup>2</sup>	-

## Notes:

3. ( )<sup>1</sup> - IS standard, ( )<sup>2</sup> - GB standard