

Aluminium and Aluminium Alloy Forgings

KES

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Contents

1. Scope of Application
2. Kind and Symbol
3. Chemical Element
4. Mechanical Properties
5. Test
6. Marking



1. Scope of Application

This standard specifies the mould forged or free forged aluminium and aluminium alloy forgings.

2. Kind and Symbol

The kind and symbol shall be as shown in Table 1.

Table 1

Kind		Symbol	Reference
Alloy No.	Division by manufacturing method		Pertinent alloy
			Alloy name of American aluminium association
1100	Mould forging	A 1100 FD	1100
1200	Mould forging	A 1200 FD	1200
2014	Mould forging	A 2014 FD	2014
	Free forging	A 2014 FH	2014
2017	Mould forging	A 2017 FD	2017
2018	Mould forging	A 2018 FD	2018
2218	Mould forging	A 2218 FD	2218
2025	Mould forging	A 2025 FD	2025
	Free forging	A 2025 FH	
2N01	Mould forging	A 2N01 FD	Britain RR59 (2618 like)
	Free forging	A 2N01 FH	
4032	Mould forging	A 4032 FD	4032
5056	Mould forging	A 5056 FD	5056
5083	Mould forging	A 5083 FD	5083
	Free forging	A 5083 FH	
6151	Mould forging	A 6151 FD	6151
	Free forging	A 6151 FH	
6061	Mould forging	A 6061 FD	6061
	Free forging	A 6061 FH	
7075	Mould forging	A 7075 FD	7075
	Free forging	A 7075 FH	

3. Chemical Element

The chemical elements of the forging shall be as shown in Table 2.

Table 2

Alloy No.	Chemical element (%)											
	Cu	Si	Fe	Mn	Mg	Zn	Cr	Ti	Zr+Ti	Ni	Others	
											Individual	Total
1100	0.05~0.20	Si+Fe	≤1.0	≤0.05	—	≤0.1	—	—	—	—	≤0.05	≤0.15
1200	≤0.05	Si+Fe	≤1.0	≤0.05	—	≤0.1	—	≤0.15	≤0.05	—	≤0.05	≤0.15
2014	3.9~5.0	0.50~1.2	≤0.7	0.4~1.2	0.2~0.8	≤0.25	≤0.1	≤0.15	≤0.15	—	≤0.05	≤0.15
2017	3.5~4.5	0.20~0.8	≤0.7	0.4~1.0	0.4~0.8	≤0.25	≤0.1	≤0.15	≤0.15	—	≤0.05	≤0.15
2018	3.5~4.5	≤0.9	≤1.0	≤0.2	0.45~0.9	≤0.25	≤0.1	—	—	1.7~2.3	≤0.05	≤0.15
2218	3.5~4.5	≤0.9	≤1.0	≤0.2	1.2~1.8	≤0.25	≤0.1	—	—	1.7~2.3	≤0.05	≤0.15
2025	3.9~5.0	0.5~1.2	≤1.0	0.4~1.2	≤0.05	≤0.25	≤0.1	≤0.15	—	—	≤0.05	≤0.15
2N01	1.5~2.5	0.5~1.3	0.6~1.5	≤0.2	1.2~1.8	≤0.20	—	≤0.20	—	0.6~1.4	≤0.05	≤0.15
4032	0.50~1.3	11.0~13.5	≤1.0	—	0.8~1.3	≤0.25	≤0.1	—	—	0.5~1.3	≤0.05	≤0.15
5056	≤0.10	≤0.3	≤0.4	0.05~0.2	4.5~5.6	≤0.1	0.05~0.2	—	—	—	≤0.05	≤0.15
5083	≤0.10	≤0.4	≤0.4	0.4~1.0	4.0~4.9	≤0.25	0.55~0.25	≤0.15	—	—	≤0.05	≤0.15
6151	≤0.35	0.6~1.2	≤1.0	≤0.2	0.45~0.8	≤0.25	0.15~0.35	≤0.15	—	—	≤0.05	≤0.15
6061	0.15~0.40	0.4~0.8	≤0.7	≤0.15	0.8~1.2	≤0.25	0.04~0.35	≤0.15	—	—	≤0.05	≤0.15
7075	1.2~2.0	≤0.4	≤0.5	≤0.3	2.1~2.9	5.1~6.1	0.18~0.28	≤0.20	≤0.25	—	≤0.05	≤0.15

4. Mechanical Properties

4.1 The mechanical properties of the mould forging shall conform to Table 3. When KIA request that the tensile test piece be taken at right angle to the forging flow direction, these shall conform to Table 4.

Table 3. Mechanical properties of mould forging (forging flow direction)

Symbol	Temper	Tensile Test					Hardness HB (10/500)
		Maximum thickness in heat treating mm	Tensile kgf/mm ² (N/mm ²)	Yield Strength kgf/mm ² (N/mm ²)	Elongation (%)		
					Test specimen	Product	
A 1100ED A 1200 FD	H112	100 or less	7.5 (74)	2.5(25) or more	25 or more	18 or more	20 or more
A 2014FD	T4	100	39(382)	21(206)	16	11	100
	T6	76	46(451)	39(382)	8	6	125
		From 76 up to 100	44 (431)	39 (382)	8	6	
A 2017FD	T4	100 or less	35 (343)	22(216)	14	10	90
A 2018FD A 2218FD	T61	100	39(382)	28(275)	10	7	100
A 2025FD	T6	100	39(382)	23(226)	16	11	100
A 2 N01FD	T6	100	38(373)	30(294)	6	6	110
A 4032FD	T6	100	37(363)	30(294)	5	3	115
A 5056FD	H112	100	25(245)	12(118)	18	15	50
A 5083FD	0	100	28(275)	12(118)	16	16	60
	H 112	100	28(275)	13(127)	16	16	60
A 6151FD	T6	100	31(304)	26(255)	14	10	90
A 6061FD	T6	100	27(265)	25(441)	10	7	80
A7075 FD	T6	25 or more	53(520) or more	55 (441) or more	10 or more	7 or more	135
		From 25 up to 76	52(510)	44(431) ↑	10 ↑	7 ↑	
		From 76 up to 100	51(500)	44(431)	10	7	
	T 73	76 or less	46(451)	39(382)	10	7	125
		From 76 up to 100	45(441)	39(382)	10	7	