

Supplementary material

Table S1. Thermal effects on fatigue life and endurance limits of aluminum alloys.

Conditions	Temperature (°C)	AA7001-T6 [3]	AA2024-T4 [14]	AA7075-T4 This work
(N_f) with applied stress (MPa)	25	21900 at 516 MPa 74534 at 447 MPa 220200 at 378 MPa	29200 at 323 MPa 79133 at 277 MPa 133200 at 231 MPa	90160 at 115 MPa 45640 at 161 MPa 18067 at 207 MPa
	150	12867 at 516 MPa 59267 at 447 MPa 134767 at 378 MPa	-	74100 at 115 MPa 36534 at 161 MPa 9534 at 207 MPa
Endurance fatigue limit at 10^7 (MPa)	25	208	95.114	21.86
	150	201	-	32.023
$S-N$ curve equations	25	$\sigma_f = 1798N_f^{-0.13384}$	$\sigma_f = 2899N_f^{-0.212}$	$\sigma_f = 7239.5N_f^{-0.36}$
	150	$\sigma_f = 1735N_f^{-0.13381}$	-	$\sigma_f = 2651.4N_f^{-0.274}$

Table S2. Fatigue test results and $S-N$ curve parameters at 25°C, 100°C and 150°C.

Temperature °C	σ_f (MPa)	N_f Cycles	N_{fav} Cycles	$S-N$ curve equation	R^2	Endurance fatigue limit (MPa)
25	115	101600, 98600, 102000	100733	$\sigma_f = 6597N_f^{-0.349}$	0.9832	23.78
	161	42800, 47000, 50700	46833			
	207	16200, 18600, 22000	18933			
100	115	96 080, 84200, 90200	90160	$\sigma_f = 7240N_f^{-0.36}$	0.9725	21.86
	161	41460, 50800, 44660	45640			
	207	16800, 20800, 16600	18067			
150°C	115	81600, 77800, 62900	74100	$\sigma_f = 1620N_f^{-0.274}$	0.9413	19.57
	161	30600, 45200, 33800	36534			
	207	9800, 8600, 10200	9534			