Extrusion Alloy Characteristics and Applications

ALLOY AND TEMPER	RESISTANCE TO CORROSION		Workability (Cold)[5]	Machinability	Brazeability[6]	WELDABILITY[6]			SOME APPLICATIONS OF ALLOYS
	General [1]	Stress-Corrosion Cracking[2]				Gas	Arc	Resistance Spot and Seam	
1060-O	A	A	A	E	A	A	A	B	Chemical equipment, railroad tank cars
H12	A	A	A	E	A	A	A	A	
H14	A	A	A	D	A	A	A	A	
H16	A	A	B	D	A	A	A	A	
H18	A	A	B	D	A	A	A	A	
1100-O	A	A	A	E	A	A	A	B	Sheet metal work, spun hollowware, fin stock
H12	A	A	A	E	A	A	A	A	
H14	A	A	A	D	A	A	A	A	
H16	A	A	B	D	A	A	A	A	
H18	A	A	C	D	A	A	A	A	
1350-O	A	A	A	E	A	A	A	B	Electrical conductors
H12, H111	A	A	A	E	A	A	A	A	
H14, H24	A	A	A	D	A	A	A	A	
H16, H26	A	A	B	D	A	A	A	A	
H18	A	A	B	D	A	A	A	A	
2014-O	..	..	..	D	D	D	D	B	Truck frames, aircraft structures
T3, T4, T451	D[3]	C	C	B	D	D	B	B	
T6, T651, T6510,T6511	D	C	D	B	D	D	B	B	
2024-O	..	..	..	D	D	D	D	D	Truck wheels, screw machine products, aircraft structures
T4, T3, T351, T3510, T3511	D[3]	C	C	B	D	C	B	B	
T361	D[3]	C	D	B	D	D	C	B	
T6	D	B	C	B	D	D	C	B	
T861, T81, T851, T8510, T8511	D	B	D	B	D	D	C	B	
T72	..	..	..	B	D	D	C	B	
2219-O	..	..	..	..	D	D	A	B	Structural uses at high temperatures (to 600° F or 316° C); High-strength weldments
T31, T351, T3510, T3511	D[3]	C	C	B	D	A	A	A	
T37	D[3]	C	D	B	D	A	A	A	
T81, T851, T8510, T8511	D	B	D	B	D	A	A	A	
T87	D	B	D	B	D	A	A	A	
3003-O	A	A	A	E	A	A	A	B	Cooking utensils, chemical equipment, pressure vessels, sheet metal work, builder's hardware, storage tanks
H12	A	A	A	E	A	A	A	A	
H14	A	A	B	D	A	A	A	A	
H16	A	A	C	D	A	A	A	A	
H18	A	A	C	D	A	A	A	A	
H25	A	A	B	D	A	A	A	A	
5083-O	A[4]	A[4]	B	D	D	C	A	B	Welded structures, especially those subject to vibration and/or fatigue.
H321, H116	A[4]	A[4]	C	D	D	C	A	A	
H111	A[4]	B[4]	C	D	D	C	A	A	

Extrusion Alloy Characteristics and Applications (continued)

ALLOY AND TEMPER	RESISTANCE TO CORROSION		Workability (Cold)[5]	Machinability	Brazeability[6]	WELDABILITY[6]			SOME APPLICATIONS OF ALLOYS
	General [1]	Stress-Corrosion Cracking[2]				Gas	Arc	Resistance Spot and	
5086-O	A[4]	A[4]	A	D	D	C	A	B	Unfired, welded pressure vessels, marine, auto, aircraft, cryogenics, TV towers, drilling rigs, transportation equipment, missile components
H32, H116	A[4]	A[4]	B	D	D	C	A	A	
H34	A[4]	B[4]	B	C	D	C	A	A	
H36	A[4]	B[4]	C	C	D	C	A	A	
H38	A[4]	B[4]	C	C	D	C	A	A	
H111	A[4]	A[4]	B	D	D	C	A	A	
5154-O	A[4]	A[4]	A	D	D	C	A	B	Welded structures, storage tanks, pressure vessels, salt water service
H32	A[4]	A[4]	B	D	D	C	A	A	
H34	A[4]	A[4]	B	C	D	C	A	A	
H36	A[4]	A[4]	C	C	D	C	A	A	
H38	A[4]	A[4]	C	C	D	C	A	A	
5454-O	A	A	A	D	D	C	A	B	Welded structures, pressure vessels, marine service
H32	A	A	B	D	D	C	A	A	
H34	A	A	B	C	D	C	A	A	
H111	A	A	B	D	D	C	A	A	
6005-T1,T5	..	..	..	..	A	A	A	A	Structural applications
6060-T1, T4	A	A	B	D	A	A	A	A	General purposes, architectural applications
T5	A	A	B	C	A	A	A	A	
T6	A	A	C	C	A	A	A	A	
6061-O	B	A	A	D	A	A	A	B	Heavy-duty structures requiring good corrosion resistance, truck and marine, railroad cars, furniture, pipelines
T4, T451, T4510, T4511	B	B	B	C	A	A	A	A	
T6, T651, T652, T6510, T6511	B	A	C	C	A	A	A	A	
6063-T1	A	A	B	D	A	A	A	A	Pipe railing, furniture, architectural extrusions
T4	A	A	B	D	A	A	A	A	
T5, T452	A	A	B	C	A	A	A	A	
T6	A	A	C	C	A	A	A	A	
T83, T831, T832	A	A	C	C	A	A	A	A	
6066-O	C	A	B	D	D	D	B	B	Forgings and extrusions for welded structures
T4, T4510, T4511	C	B	C	C	D	D	B	B	
T6, T6510, T6511	C	B	C	B	D	D	B	B	
6070-T4, T4511	B	B	B	C	D	A	A	A	Heavy-duty welded structures, pipelines
T6	B	B	C	C	D	A	A	A	
6101-T6, T63	A	A	C	C	A	A	A	A	High-strength bus conductors
T61, T64	A	A	B	D	A	A	A	A	
6105-T1, T5	B	A	C	C	A	A	B	A	General purposes, architectural
6262-T6, T651, T6510, T6511	B	A	C	B	B	B	B	A	Screw machine products
T9	B	A	D	B	B	B	B	A	
6351-T1	..	..	C	C	C	B	A	B	Extruded shapes, structural, pipe and tube
T4	A	..	C	C	C	B	A	B	
T5	A	..	C	C	C	B	A	A	
T6	A	..	C	C	C	B	A	A	

Extrusion Alloy Characteristics and Applications (continued)

ALLOY AND TEMPER	RESISTANCE TO CORROSION		Workability (Cold)[5]	Machinability	Brazeability[6]	WELDABILITY[6]			SOME APPLICATIONS OF ALLOYS
	General [1]	Stress-Corrosion Cracking[2]				Gas	Arc	Resistance Spot and Seam	
6463-T1	A	A	B	D	A	A	A	A	Extruded architectural and trim sections
T5	A	A	B	C	A	A	A	A	
T6	A	A	C	C	A	A	A	A	
7005-T53	..	..	..	..	B	C	A	A	
7050-T73510, T73511, T74[7], T7451[7], T74510[7], T74511[7], T7452[7], T7651, T76510, T76511	C	B	D	B	D	D	D	B	Aircraft and other structures
7075-O	..	..	..	D	D	D	D	B	Aircraft and other structures
T6, T651, T652, T6510, T6511	C[3]	C	D	B	D	D	D	B	
T73, T7351	C	B	D	B	D	D	D	B	
7178-O	..	..	..	..	D	D	D	B	Aircraft and other structures
T6, T651, T6510, T6511	C[3]	C	D	B	D	D	D	B	

Notes for table

[1] Ratings A through E are relative ratings in decreasing order of merit, based on exposures to sodium chloride solution by intermittent spraying or immersion. Alloys with A and B ratings can be used in industrial and seacoast atmospheres without protection. Alloys with C, D, and E ratings generally should be protected at least on faying surfaces.

[2] Stress-corrosion cracking ratings are based on service experience and on laboratory tests of specimens exposed to the 3.5% sodium chloride alternate immersion test.
A = No known instance of failure in service or in laboratory tests.
B = No known instance of failure in service; limited failures in laboratory tests of short transverse specimens.
C = Service failures with sustained tension stress acting in short transverse direction relative to grain structure; limited failures in laboratory tests of long transverse specimens.
D = Limited service failures with sustained longitudinal or long transverse areas.

These ratings are neither product specific nor test direction specific and therefore indicate only the general level of stress-corrosion cracking resistance. For more specific information on certain alloys, see ASTM G64.

[3] In relatively thick sections the rating would be E.

[4] This rating may be different for material held at elevated temperature for long periods.

[5] Ratings A through D for Workability (cold), and A through E for Machinability, are relative ratings in decreasing order of merit.

[6] Ratings A through D for Weldability and Brazeability are relative ratings defined as follows:
A = Generally weldable by all commercial procedures and methods.
B = Weldable with special techniques or for specific applications that justify preliminary trials or testing to develop welding procedure and weld performance.
C = Limited weldability because of crack sensitivity or loss in resistance to corrosion and mechanical properties.
D = No commonly used welding methods have been developed.

[7] T74 type tempers, although not previously registered, have appeared in various literature and specifications as T736 type tempers.

Except for alloys 6060 and 6105, reproduced from *Aluminum Standards and Data*, 1997, Table 3.3.