Alcan Rolled Products UK
Falkirk

Sheet & Strip Products

Aluminium Alloy Data Sheet

1050A

Sheet 1 of 1

BRIEF DESCRIPTION

Low strength; high corrosion reisistance; high thermal and electrical conductivity; easy to form; easy to weld. Well suited to applications where surface characteristics are important such as chemical brightening and anodizing. Typical applications include; chemical, pharmacuetical and food industries, containers, appliances, foil, closures etc.

PROCESSING METHODS

Weldability :

TIG/MIG - excellent
Resistance - good to excellent

Anodising Response :

Protective - excellent
Decorative - excellent in softer tempers

Forming :

Hot bending - excellent, though local softening would be expected in any temper other than soft.
Cold bending - high at quarter hard, fair above (see bend radii)
Deep draw - high up to quarter hard, not generally done in harder tempers
Spinning - high up to quarter hard, not generally done in harder tempers

Machinability :

Moderate to poor

CORROSION BEHAVIOUR

Excellent under normal weather conditions and in industrial and marine applications.

TYPICAL PHYSICAL PROPERTIES

Density :	2.71 g/cm^3
Modulus of elasticity :	69,000 N/mm^2
Coefficient of linear thermal expansion (20-100°C) :	23.6 x 10^{-6} K^{-1}
Thermal conductivity :	210-230 W/mK
Specific electrical conductivity	34-36 m/Ωmm^2 @ 20°C
Melting Range	645-657 °C

PROPERTIES

Chemical Composition

	Si %	Fe %	Cu %	Mn %	Mg %	Cr %	Zn %	Ni %	Ti %
Max	0.25	0.40	0.05	0.05	0.05	-	0.07	-	0.05
Min									

Tolerances to EN 573-3 : 1994
Note Aluminium Content (by difference to be 99.50% Minimum)

Tensile Properties

Temper	Gauge (mm)		0.2 % Proof Stress Min N/mm²	Tensile Strength N/mm²		Elongation on 50 mm %
	Over	Upto		Min	Max	
O	0.2	0.5	20	65	95	20
	0.5	1.5				22
	1.5	3				26
H12	0.2	0.5	65	85	125	2
	0.5	1.5				4
	1.5	3				5
H14	0.2	0.5	85	105	145	2
	0.5	1.5				3
	1.5	3				4
H24	0.2	0.5	75	105	145	2
	0.5	1.5				3
	1.5	3				5
H16	0.2	0.5	100	120	160	1
	0.5	1.5				2
	1.5	4				3
H18	0.2	0.5	120	140		1
	0.5	1.5				2
	1.5	3				2

Tolerances to EN 485-2 : 1994

Minimum Recommended 90° Bend Radii

Temper	Max. Material Thickness (mm)		
	0.5	1.5	3
O	0t	0t	0t
H12	0t	0t	0.5t
H14	0t	0.5t	1.0t
H24	0T	.5T	1T
H16	0.5t	1.0t	1.5t*
H18	1.0t	2.0t	3.0t

*: Max thickness = 4mm

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Table of properties

for semi-finished rolled aluminium goods

Mechanical Properties for Standard Alloys

Alloy EN AW EN 573-3	Temper EN 512	Temper DIN	Mechanical Values EN 485-2 Tensile strength R_m (MPa) min.–max.	Proof stress $R_{p0.2}$ (MPa) min.	Elongation min. A_{50} (%) for nominal gauges	min. Bending Radius Factor for nominal gauges and bending up to 90° (Radius = F x nominal gauge)
					> 0.2 ≤ 0.5 / > 0.5 ≤ 1.5 / > 1.5 ≤ 3.0 / > 3.0 ≤ 6.0 / > 6.0 ≤ 10.0	> 0.2 ≤ 0.5 / > 0.5 ≤ 1.5 / > 1.5 ≤ 3.0 / > 3.0 ≤ 6.0 / > 6.0 ≤ 10.0
1050A (Al 99.5) density: 2.706 t/m³	0/H111	W7	65–90	20	20 22 26 29 35	0 0 0 0.5 1.0
	H12	F9	85–125	65 (min. 0.9 mm)	4 5 7	0 0.5 1.0
	H22	G9	85–125	55	4 5 6 11	0 0 0.5 1.0
	H14	F11	105–145	85	2 3 4 5	0 0.5 1.0 1.5
	H24	G11	105–145	75	3 4 5 8	0 0.5 1.0 1.5
	H16	F13	120–160	100	1 2 3 3*	0.5 1.0 1.5 1.5*
	H26	G13	120–160	90	2 3 4 4*	0.5 1.0 1.5 1.5*
	H18		140	120	1 2 2	1.0 2.0 3.0
	H28		140	110	2 2	1.0 2.0 3.0
	H19	F15	150	130	1 1	
1200 (Al 99.0) density: 2.711 t/m³	0/H111	W8	75–105	25	19 21 24 28 33	0 0 0 0.5 1.0
	H12	F10	95–135	75 (min. 0.9 mm)	4 5 6	0 0 0.5 1.0
	H22	G10	95–135	65	4 5 6 10	0 0 0.5 1.0
	H14	F12	115–155	95	2 3 4 5	0 0.5 1.0 1.5
	H24		115–155	90	3 4 5 7	0 0.5 1.0 1.5
	H16	F14	130–170	115	1 2 3 3*	0.5 1.0 1.5 1.5*
	H26		130–170	105	2 3 4 4*	0.5 1.0 1.5 1.5*
	H18		150	130	1 2 2	1.0 2.0 3.0
	H19	F16	160	140	1 1 1	
3003 (Al Mn1 Cu) density: 2.731 t/m³	0/H111	W10	95–135	35	15 17 20 23 24	0 0 0 1.0 1.5
	H12	F13	120–160	90 (min. 0.7 mm)	4 5 6	0 0.5 1.0 1.0
	H22		120–160	80	6 7 8 9	0 0.5 1.0 1.0
	H14	F15	145–185	125	2 2 3 4	0.5 1.0 1.0 2.0
	H24		145–185	115	4 4 5 6	0.5 1.0 1.0 2.0
	H16	F17	170–210	150	1 2 2 2*	1.0 1.5 2.0 2.0*
	H18	F19	190	170	1 2 2	1.5 2.5 3.0
	H19		210	180	1 2	
3103 (Al Mn1) density: 2.729 t/m³	0/H111	W9	90–130	35	17 19 21 24 28	0 0 0 1.0 1.5
	H12	F12	115–155	85 (min. 0.7 mm)	4 5 6	0 0.5 1.0 1.0
	H22		115–155	75	6 7 8 9	0 0.5 1.0 1.0
	H14	F14	140–180	120	2 2 3 4	0.5 1.0 1.0 2.0
	H24		140–180	110	4 4 5 6	0.5 1.0 1.0 2.0
	H16	F17	160–200	145	1 2 2 2*	1.0 1.5 2.0 2.0*
	H18	F19	185	135	1 2 2	1.5 2.5 3.0
	H19		200	155	1 2	1.5 2.5
3004 (Al Mn1 Mg1) density: 2.714 t/m³	0/H111	W16	155–200	60	13 14 15 16 16	0 0 0 1.0 2.0
	H12	F19	190–240	155	2 3 4 5	0 0.5 1.0 1.5
	H22/32	G19	190–240	145	4 5 6 7	0 0.5 1.0 1.5
	H14	F22	220–265	180	1 2 2 3	0.5 1.0 1.5 2.0
	H24/34	G22	220–265	170	3 4 4	0.5 1.0 1.5
	H16	F24	240–285	200	1 1 2 2*	1.0 1.5 2.5 2.5*
	H26/36	G24	240–285	190	3 3 3	1.0 1.5 2.5
	H18	F28	260	230	1 1	1.5 2.5
	H28/38	G28	260	220	2 3	1.5 2.5
	H19		270	240	1 1	
3104 (Al Mn1 Mg1 Cu) density: 2.714 t/m³	0/H111	W16	155–200	60	13 14 15 16 16	0 0 0 1.0 2.0
	H12	F19	190–240	155	2 3 4 5	0 0.5 1.0 1.5
	H22/32	G19	190–240	145	4 5 6 7	0 0.5 1.0 1.5
	H14	F22	220–265	180	1 2 2 3	0.5 1.0 1.5 2.0
	H24/34	G22	220–265	170	3 4 4	0.5 1.0 1.5
	H16	F24	240–285	200	1 1 2 2*	1.0 1.5 2.5 2.5*
	H26/36	G24	240–285	190	3 3 3	1.0 1.5 2.5
	H18	F28	260	230	1 1 2	1.5 2.5
	H28/38	G28	260	220	2 3	1.5 2.5
	H19		270	240	1 1	
3005 (Al Mn1 Mg0.5) density: 2.721 t/m³	0/H111	W12	115–165	45	12 14 16 19	0 0 0.5 1.0
	H12	F16	145–195	125	3 4 4 5	0 0.5 1.0 1.5
	H22	G16	145–195	110	5 5 6 7	0 0.5 1.0 1.5
	H14	F18	170–215	150	1 2 2 3	0.5 1.0 1.5 2.0
	H24	G18	170–215	130	4 4 4	0.5 1.0 1.5
	H16	F20	195–240	175	1 2 2 2*	1.0 1.5 2.5 2.5*
	H26	G20	195–240	160	3 3 3	1.0 1.5 2.5
	H18	F22	220	200	1 2	1.5 2.5
	H28		220	190	2 2	1.5 2.5
	H19	F24	235	210	1 1	

Mechanical Properties for Standard Alloys

Alloy EN AW EN 573-3	Temper EN 512	Temper DIN	Mechanical Values EN 485-2 Tensile strength R_m (MPa) min.–max.	Proof stress $R_{p0.2}$ (MPa) min.	Elongation min. A_{50} (%) for nominal gauges > 0.2 ≤ 0.5	0.5 1.5	1.5 3.0	3.0 6.0	6.0 10.0	min. Bending Radius Factor for nominal gauges and bending up to 90° (Radius = F x nominal gauge) > 0.2 ≤ 0.5	0.5 1.5	1.5 3.0	3.0 6.0	6.0 10.0
3105	0/H111		100–155	40	14	15	17			0	0	0.5		
(Al Mn0.5 MG0.5)	H12		130–180	105 (min. 0.7 mm)	3	4	4			1.5	1.5	1.5		
	H22		130–180	105	6	6	7							
density:	H14		150–200	130	2	2	2			2.5	2.5	2.5		
2.711 t/m³	H24		150–200	120	4	4	5			2.5	2.5	2.5		
	H16		175–225	160	1	2	2							
	H26		175–225	150	3	3	3							
	H18		195	180	1	1	1							
	H28		195	170	2	2								
	H19		215	190	1	1								
5005	H12	F13	125–165	95 (min. 0.8 mm)				5 *					1.0	
(AlMg1-B) EQ	H14	F15	145–185	120		2	3				1.0	1.0		
density: 2.695 t/m³														
5005A	0/H111	W11	100–145	35	15	19	20	22	24	0	0	0	1.0	1.5
(Al Mg1-C)	H12	F13	125–165	95 (min. 0.7 mm)		2	4	5		0	0.5	1.0	1.0	
	H22/32	G13	125–165	80	4	5	6	8		0	0.5	1.0	1.0	
density:	H14	F15	145–185	120	2	2	3	4		0.5	1.0	1.0	2.0	
2.693 t/m³	H24/34	G15	145–185	110	3	4	5	6		0.5	1.0	1.0	2.0	
	H16	F17	165–205	145	1	2	3	3 *		1.0	1.5	2.0	2.5 *	
	H26/36	G17	165–205	135	2	3	4	4 *		1.0	1.5	2.0	2.5 *	
	H18	F19	185	165	1	2	2			1.5	2.5	3.0		
	H28/38	G19	185	160	1	2	3			1.5	2.5	3.0		
	H19	F21	205	185	1	2								
5005A	H12	F13	125–165	95				5 *					1.0	
(Al Mg1-C) EQ	H14	F15	145–185	120		2	3				1.0	1.0		
density: 2.693 t/m³														
5049	0/H111	W19	190–240	80	12	14	16	18	18	0	0.5	1.0	1.0	2.0
(Al Mg2 Mn0.8)	H12	F22	220–270	170	4	5	6	7						
	H22/32	G22	220–270	130	7	8	10	11		0.5	1.0	1.5	1.5	
density:	H14	F24	240–280	190	3	3	4	4						
2.698 t/m³	H24/34	G24	240–280	160	6	6	7	8		1.0	1.5	2.0	2.5	
	H16	F27	265–305	220	2	3	3							
	H26/36	G27	265–305	190	4	4	5	6		1.5	2.0	3.0		
	H18	F29	190	250	1	2								
	H28/38		290	230	3	3								
5251	0/H111	W16	160–200	60	13	14	16	18	18	0	0	0.5	1.0	2.0
(Al Mg2)	H12	F19	190–230	150	3	4	5	8		0	1.0	1.0	1.5	
	H22/32		190–230	120	4	6	8	10		0	1.0	1.0	1.5	
density:	H14	F21	210–250	170	2	2	3	4		0.5	1.5	1.5	2.5	
2.684 t/m³	H24/34	G21	210–250	140	3	5	6	8		0.5	1.5	1.5	2.5	
	H16	F23	230–270	200	1	2	3	3 *		1.0	1.5	2.0		
	H26/36	G23	230–270	170	3	4	5			1.0	1.5	2.0		
	H18	F26	255	230	1	2								
	H28/38		255	200	2	3	3							
5052	0/H111	W17	170–215	65	12	14	16	18	19	0	0	0.5	1.0	2.0
(Al Mg2.5)	H12	F21	210–260	160	4	5	6	8						
	H22/32	G21	210–260	130	5	6	7	10		0.5	1.0	1.5	1.5	
density:	H14	F23	230–280	180	3	3	4	4						
2.674 t/m³	H24/34	G23	230–280	150	4	5	6	7		0.5	1.5	2.0	2.5	
	H16	F25	250–300	210	2	3	3	3						
	H26/36	G25	250–300	180	3	4	5	6		1.5	2.0	3.0	3.5	
	H18	F27	270	240	1	2	2							
	H28/38	G27	270	210	3	3								
5454	0/H111		215–275	85	12	13	15	17	18	0.5	0.5	1.0	1.5	2.5
(Al Mg3 Mn)	H12		250–305	190	3	4	5	6						
	H22/32	G25	250–305	180	5	6	7	8		0.5	1.0	2.0	2.5	
density:	H14		270–325	220	2	3	3	4						
2.682 t/m³	H24/34	G27	270–325	200	4	5	6	7		1.0	2.0	2.5	3.0	
	H26/36		290–345	230	3	3	4							
	H28/38		310	250	3	3								

Mechanical Properties for Standard Alloys

Alloy EN AW EN 573-3	Temper EN 512	Temper DIN	Tensile strength R_m (MPa) min.–max.	Proof stress $R_{p0.2}$ (MPa) min.	Elongation min. A_{50} (%) for nominal gauges > 0.2 ≤ 0.5	> 0.5 ≤ 1.5	> 1.5 ≤ 3.0	> 3.0 ≤ 6.0	> 6.0 ≤ 10.0	min. Bending Radius Factor for nominal gauges and bending up to 90° (Radius = F x nominal gauge) > 0.2 ≤ 0.5	> 0.5 ≤ 1.5	> 1.5 ≤ 3.0	> 3.0 ≤ 6.0	> 6.0 ≤ 10.0
5754 (Al Mg3) density: 2.671 t/m³	0/H111	W19	190–240	80	12	14	16	18	18	0	0.5	1.0	1.0	2.0
	H12	F22	220–270	170	4	5	6	7						
	H22/32	G22	220–270	130	7	8	10	11		0.5	1.0	1.5	1.5	
	H14	F24	240–280	190	3	3	4	4						
	H24/34	G24	240–280	160	6	6	7	8		1.0	1.5	2.0	2.5	
	H16	F27	265–305	220	2	3	3	3						
	H26/36	G27	265–305	190	4	4	5			1.5	2.0	3.0		
	H18	F29	290	250	1	2	2							
	H28/38		290	230	3	3								
5086 (Al Mg4) density: 2.657 t/m³	0/H111	W24	240–310	100	11	12	13	15	17	0.5	1.0	1.0	1.5	2.5
	H116		275	195 (4–6 mm)				9					2.5	
	H12	F28	275–335	200	3	4	5	6						
	H22/32	G28	275–335	185	5	6	7	8		0.5	1.5	2.0	2.5	
	H14		300–360	240	2	3	3	3						
	H24/34	G30	300–360	220	4	5	6	7		1.0	2.0	2.5	3.5	
	H16		325–385	270	1	2	2							
	H26/36		325–385	250	2	3	3	3*						
	H18		345	290	1	1	1							
5182 (Al Mg4.5 Mn0.4) density: 2.646 t/m³	0/H111		255–315	110	11	12	13							
	H19		380	320	1	1								
5182 (Al Mg4.5 Mn0.4) nach AD-W 6.1 density: 2.646 t/m³	H111		280–330	125 (4–9 mm)				26	26				1.5	1.5
5083 (Al Mg4.5 Mn0.7) density: 2.657 t/m³	0/H111	W28	275–350	125	11	12	13	15	16	0.5	1.0	1.0	1.5	2.5
	H16		305	215 (4–6 mm)				10					2.5	
	H12		315–375	250	3	4	5	6						
	H22/32	G31	305–380	215	5	6	7	8		0.5	1.5	2.0	2.5	
	H14		340–400	280	2	3	3	3						
	H24/34	G35	340–400	250	4	5	6	7		1.0	2.0	2.5	3.5	
	H16		360–420	300	1	2	2	2						
	H26/36		360–420	280	2	3	3	3						
8011A (Al Fe Si -A) density: 2.713 t/m³	0/H111	W8	80–130	30	19	21	24	25	30					
	H22		105–145	90	4	5	6							
	H14	F13	125–165	110	2	3	3	4						
	H24	G13	125–165	100	3	4	5	6						
	H16		145–185	130	1	2	3	3*						
	H26		145–185	120	2	3	4							
	H18	F17	165	145	1	2								
6061 (Al Mg1 Si Cu) density: 2.701 t/m³	0	W	150	≤ 85	16	19				0.5	1.0			
	T4	F21	205	110 (min. 0.6 mm)	12	14				1.0	1.5			
	T6	F29	290	240 (min. 0.6 mm)	6	7				2.5	3.5			
6082 (Al Si Mg Mn) density: 2.702 t/m³	0	W	150	≤ 85	14	16				0.5	1.0			
	T4	F21	205	110 (min. 0.6 mm)	12	14				1.5	2.0			
	T6	F30/32	310	260 (min. 0.6 mm)	6	7				2.5	3.5			

Alutrans® A Plus

Maximum gauges: The mentioned max. gauges not always correspond to production facilities.

Thermal expansion: The thermal expansion of aluminium between 20 °C and 100 °C e. g. for AW 5005 (Al Mg1) is 0.0236 mm and for AW 5083 (Al Mg4.5 Mn0.7) is 0.0242 mm per degree per meter length.

Modulus of elasticity: The modulus of elasticity of aluminium is approx. 70.000 MPa.

*marked values are valid for gauges over 3 mm up to 4 mm

Standard Alloys – Chemical Composition

Alloy EN AW EN 573-3	max. content in percent by weight									
	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Other each	Other total
1050A	0.25	0.40	0.05	0.05	0.05		0.07	0.05	0.03	
1200	1.0 Si+Fe		0.05	0.05			0.10	0.05	0.05	0.15
3003	0.60	0.70	0.05–0.2	1.0–1.5			0.10		0.05	0.15
3103	0.50	0.70	0.10	0.9–1.5	0.30	0.10	0.20		0.05	0.15
3004	0.30	0.70	0.25	1.0–1.5	0.8–1.3		0.25		0.05	0.15
3104	0.60	0.80	0.05–0.25	0.8–1.4	0.8–1.3		0.25	0.10	0.05	0.15
3005	0.60	0.70	0.30	1.0–1.5	0.2–0.6	0.10	0.25	0.10	0.05	0.15
3105	0.60	0.70	0.30	0.3–0.8	0.2–0.8	0.20	0.40	0.10	0.05	0.15
5005	0.30	0.70	0.20	0.20	0.5–1.1	0.10	0.25		0.05	0.15
5005A	0.30	0.45	0.05	0.15	0.7–1.1	0.10	0.20		0.05	0.15
5049	0.40	0.50	0.10	0.5–1.1	1.6–2.5	0.30	0.20	0.10	0.05	0.15
5251	0.40	0.50	0.15	0.1–0.5	1.7–2.4	0.15	0.15	0.15	0.05	0.15
5052	0.25	0.40	0.10	0.10	2.2–2.8	0.15–0.35	0.10		0.05	0.15
5454	0.25	0.40	0.10	0.5–1.0	2.4–3.0	0.05–0.2	0.25	0.20	0.05	0.15
5754*	0.40	0.40	0.10	0.50	2.6–3.6	0.30	0.20	0.15	0.05	0.15
5086	0.40	0.50	0.10	0.2–0.7	3.5–4.5	0.05–0.25	0.25	0.15	0.05	0.15
5182	0.20	0.35	0.15	0.2–0.5	4.0–5.0	0.10	0.25	0.10	0.05	0.15
5083	0.40	0.40	0.10	0.4–1.0	4.0–4.9	0.05–0.25	0.25	0.15	0.05	0.15
8011A	0.4–0.8	0.5–1.0	0.10	0.10	0.10	0.10	0.10	0.05	0.05	0.15
6061	0.4–0.8	0.70	0.15–0.4	0.15	0.8–1.2	0.04–0.35	0.25	0.15	0.05	0.15
6082	0.7–1.3	0.50	0.10	0.4–1.0	0.6–1.2	0.25	0.20	0.10	0.05	0.15

*Mn + Cr = 0.10–0.60 %

Other alloys of 1xxx-, 3xxx-, 5xxx-, 6xxx-, and 8xxx-series on request.

Conversion Factors

1 mm	=	0.0394 in.	1 in.	=	25.399 mm	1 MPa	=	1 N/mm²
1 m	=	3.281 ft.	1 ft. = 12 in.	=	304.799 mm	1 MPa	=	145.04 lb./sq. in.
1 mm²	=	0.00155 sq. in.	1 sq. in.	=	645.16 mm²	1 MPa	=	0.14505 ksi
1 m²	=	10.764 sq. ft.	1 sq. ft. = 144 sq. in.	=	0.093 m³	1 ksi = 1000 psi	=	6.895 MPa
1 mm³	=	0.000061 cu. in.	1 cu. in.	=	16386.979 mm³	1 lb./sq. in. = 1 psi	=	0.006895 N/mm²
1 m³	=	35.315 cu. ft.	1 cu. ft. = 1728 cu. in.	=	0.0283167 m³	1 N/mm²	=	145.04 psi
1 kg	=	2.205 lb.	1 lb.	=	0.45359 kg	°F	=	9/5 x °C + 32°
1 kg/dm³	=	62.43 lb./cu. ft.	1 lb./cu. ft.	=	0.01602 kg/dm³	°C	=	5/9 x (°F - 32°)

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Novelis Deutschland GmbH
Werk Nachterstedt
Gaterslebener Str.1
06469 Nachterstedt
Germany
Tel. +49 34741 77-0
Fax +49 34741 77-1259
www.novelis-nachterstedt.com

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