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Aluminium 1050P

Description

1050P is the highest purity commercially pure aluminum sheet (≥99.5%). It is not heat-treatable. Its greatest advantages are excellent electrical and thermal conductivity (62% IACS, 231 W/m·K) and extremely high plasticity (elongation ≥ 35%). It is suitable for applications requiring high conductivity and deep drawing, such as cable sheathing, heat exchangers, and food containers.

1050P Aluminium Alloy Material Data Sheet

1. Chemical Composition (%)

Elements	Al	Si	Fe	Cu	Mn	Mg	Zn	Ti	Other (individual)	Other (total)
Content	≥99.50	≤0.25	≤0.40	≤0.05	≤0.05	≤0.05	≤0.05	≤0.03	≤0.03	

Feature: Higher molybdenum content than 1100 (≥99.5% vs ≥99.0%), fewer impurities, and better electrical and thermal conductivity

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2. Physical Properties

Performance parameters	Value	Unit	Note
Density	2.705	g/cm	Standard values
Melting range	646~657	°C	Solidus–Liquidus range
Elastic modulus	68~71	GPa	Tensile/compression properties
Poisson's ratio	0.33	-	Typical Value
Coefficient of Thermal Expansion	23.6	μm/m-K	20-100°C
Thermal conductivity	222~231	W/(m-K)	Extremely high among pure molybdenum at 20°C
Electrical conductivity	57%~62%	IACS	Equivalent to 57–62% of the electrical conductivity of copper
Resistivity	0.0281	μΩ•m	20°C
Specific heat capacity	0.900	kJ/(kg•K)	PDF
Reflectivity	~86%	-	Visible light, bare metal

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3. Mechanical Properties (by Temper)

State	Tensile strength Rm (MPa)	Yield strength Rp0.2 (MPa)	Elongation A (%)	Hardness HB	Feature description
O (annealing)	60~100	20~40	≥35	20~25	Fully softened with extremely high plasticity
H12	80~120	60~80	10~15	-	1/4 hard, slight work hardening
H14	95~130	75~100	6~10	-	Half-hard, strength and formability
H24	≥95	≥75	≥6	-	Most commonly used sheet temper
H18	≥140	≥120	2~5	-	Full hard, maximum cold working

H24 is the most commonly used temper for sheet products, with tensile strength ≥ 95 MPa, yield strength ≥ 75 MPa, and elongation ≥ 6%.

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4. Process Performance

Items	Performance classification	Description
Weldability	★★★★★Excellent	Suitable for gas welding, resistance welding, atomic hydrogen welding, and shielded gas welding
Formability	★★★★★Excellent	Elongation ≥ 35% in O temper, with excellent deep drawing, bending, and spinning performance
Machinability	★★☆☆☆Moderate	Prone to tool adhesion; requires sharp tools, large rake angle, and adequate cooling
Corrosion resistance	★★★★★Excellent	Suitable for atmospheric, water, and mild acid/alkaline environments, plus protection by natural oxide film
Anodizing	★★★★★Excellent	High surface gloss with excellent decorative effect
Heat treatment	-	Not heat-treatable; strengthened only by cold working

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5 Characteristics and Applications

Core characteristics	Typical applications
Excellent electrical and thermal conductivity (62% IACS，231 W/m·K)	Cable sheathing, busbars, conductive strips, heat sinks, heat exchangers
Excellent plasticity (elongation ≥ 35% in O temper)	Deep-drawn containers, aluminum foil, food packaging, bottle caps, lamp shades
High surface finish	Lamp reflectors, decorative panels, signboards, solar collector plates
Excellent corrosion resistance	Chemical equipment, storage tanks, pipes, building curtain walls
Excellent weldability	Air conditioning tubing, welded structural components, battery flexible connectors
Good anodizing effect	Electronic product housings, decorative trim, appliance panels

6. Codes and Standards

Type of standard	No.
Chinese standard	GB/T 3880-2006, GB/T 3190-2008, GB/T 6893-2000
U.S. standard	ASTM B209, AMS 4001
European standard	EN AW-1050A
Japanese standard	JIS A1050P