

ALUMINIUM 1350 AND ALUMINIUM ALLOY RODS (CHEMICAL COMPOSITION)

Element		Composition (%)			
		1350	6201	6101	1120
Silicon	Max.	0.10	0.5 ~ 0.9	0.4 ~ 0.7	0.10
Iron	Max.	0.40	0.50	0.50	0.40
Copper	Max.	0.05	0.10	0.10	0.05 ~ 0.35
Manganese	Max.	0.01	0.03	0.03	0.01
Magnesium	Max.	-	0.6 ~ 0.9	0.4 ~ 0.7	0.20
Chromium	Max.	0.01	0.03	0.03	0.01
Zinc	Max.	0.05	0.10	0.10	0.05
Boron	Max.	0.05	0.06	0.06	0.05
Gallium	Max.	0.03	-	-	0.03
Vanadium & Titanium, total	Max.	0.02	-	-	0.02
Other elements, each	Max.	0.03	0.03	0.03	0.03
Other elements, total	Max.	0.10	0.10	0.10	0.10
Aluminium	Min.	99.50	Remainder	Remainder	99.20

MECHANICAL AND ELECTRICAL PROPERTIES

Designation	Tensile strength	Conductivity at 20 °C	Volume resistivity at 20 °C
	Kgf/mm ²	% IACS	Ohm.mm ² /m
Aluminium 1350 Rod			
1350 - O	6.0 ~ 9.9	61.8	0.027899
1350 - H12 & H22	8.5 ~ 11.9	61.5	0.028035
1350 - H14 & H24	10.5 ~ 14.1	61.4	0.028080
1350 - H16 & H26	11.9 ~ 15.5	61.3	0.028126
Aluminium Alloy Rod *			
6201	16 ~ 19	51	0.033806
6101	16 ~ 19	52	0.033156
1120	17 ~ 18.5	58.8	0.029300

* The aluminium alloy rod after redraw into the final diameter of wire and under controlled heat treatment will comply with the requirements as per ASTM B 398 and IEC 60104.

The aluminium alloy rod will age or harden over time, thus immediate redraw into the final diameter of wire is recommended.

DIAMETER TOLERANCE

Specified diameter	Deviation of mean diameter from specified diameter	Deviation at any point from specified diameter
mm	mm	mm
9.52	± 0.51	± 0.76

PROPERTIES OF ALUMINIUM, ALUMINIUM ALLOY AND COPPER

Characteristics	Unit	Aluminium		Aluminium Alloy Rod			Copper	
		Hard-drawn	Annealed	6201	6101	1120	Hard-drawn	Annealed
Specific gravity	g/cm ³	2.703	2.703	2.703	2.703	2.703	8.89	8.89
Tensile strength	Kgf/mm ²	Min. 16	Max. 9.2	16 ~ 19	16 ~ 19	17 ~ 18.5	34 ~ 47	20 ~ 28
Electrical resistivity at 20°C	μ Ohm.cm	2.8264	2.803	3.38	3.31	2.93	1.777	1.724
Conductivity at 20°C	% IACS	61	61.5	51	52	58.8	97	100
Temperature coefficient at 20°C	per °C	0.00403	0.00410	0.00347	0.00347	0.00390	0.00381	0.00393
Coefficient of linear expansion	x 10 ⁻⁶ / °C	23	23	23	23	23	17	17

Mechanical properties of aluminium alloy wires as per **ASTM B 398**

Nominal diameter (mm)		Tensile strength (MPa)		Elongation (%)
Over	Up to and including	Average for a lot	Individual	Individual
1.5	3.25	330	315	3.0
3.25	4.75	315	305	3.0

Mechanical properties of aluminium alloy wires as per **IEC 60104**

Nominal diameter (mm)		Tensile strength (MPa)	Elongation (%)
Over	Up to and including	Minimum	Minimum
---	3.5	325	3.0
3.5	---	315	3.0

Electrical properties of aluminium alloy wires as per **ASTM B 398 and IEC 60104**

Nominal diameter (mm)		Tolerance	Resistivity	Conductivity
Over	Up to and including	(mm)	(Ohm.mm ² /m)	(% IACS)
---	3.00	± 0.03	0.03284	52.5
3.00	---	± 1%	0.03284	52.5

Mechanical and electrical properties of aluminium 1120 wires as per **AS 1531**

Nominal diameter (mm)		Tensile strength	Elongation	Resistivity	Conductivity
Over	Up to and including	(MPa)	(%)	(Ohm.mm ² /m)	(% IACS)
1.5	2.5	250	0.8	0.0293	58.8
2.5	3.25	250	1.0	0.0293	58.8
3.25	3.75	240	1.2	0.0293	58.8
3.75	4.00	230	1.2	0.0293	58.8
4.00	4.75	230	1.4	0.0293	58.8

COMPARISON OF ALUMINIUM AND COPPER CONDUCTORS

Particular	Hard-drawn Aluminium	Copper (annealed)
	Take annealed copper as 100%	Take hard-drawn aluminium as 100%
	%	%
For equal sectional area and length		
Weight	30	329
Resistance	164	61
Approximate breaking load	41	244
For equal weight and length		
Area	329	30
Diameter	180	55
Resistance	50	200
Approximate breaking load	137	73
For equal resistance		
Area	164	61
Diameter	128	78
Weight	50	200
Approximate breaking load	68	147
For equal current and temperature rise		
Weight	42	237
Diameter	119	84