



ALUMINIUM ROD

EC Grade & Alloy / Continuous Cast & Rolled



About Universal Metals

Universal Metals (Pvt.) Ltd operates a state-of-the-art European continuous casting and rolling (CCR) line from the world leader in CCR technology. Our facility produces EC grade aluminium rod (AA 1350) in full compliance with ASTM B233 and IEC 60889. We use 99.7% purity P 1020 aluminium ingots as feedstock, processed through in-line ceramic foam filtration and spectrometer-verified quality control at every stage to deliver finished rod with 99.7% aluminium purity.

In addition to EC grade production, our CCR line is capable of manufacturing alloy aluminium rod across the 1xxx, 4xxx, 5xxx, 6xxx, and 8xxx series, giving us one of the most versatile aluminium rod production platforms in Pakistan. With 11 alloys across 5 series, we serve the entire spectrum from overhead transmission conductors to building wire and welding feedstock.

Applications

Our aluminium rods serve as the primary feedstock for a wide range of downstream products:

- AAC Conductors
- AAAC Conductors
- ACSR Conductors
- ABC Cables
- Power Cables (LV)
- Building Wire (8xxx series)
- Enamelled Aluminium Wire
- Paper Covered Aluminium Strip
- Welding Wire Feedstock
- Bus Bar Conductors

Reference Standards: ASTM B233, IEC 60889. All diameters 9.5 ± 0.5 mm.

Product Code	Si (%)	Fe (%)	Cr (%)	Mn (%)	Al (%)	Temper	Tensile (MPa)		Elong. (%)	Cond. (%)
	Max	Max	Max	Max	Min		Min	Max	Min	Min
1080A	0.15	0.15	0.01	0.02	99.80	H11	83	95	25	61.9
	0.15	0.15	0.01	0.02	99.80	H12	95	110	20	61.5
1350	0.10	0.40	0.01	0.01	99.50	H11	83	95	25	61.9
	0.10	0.40	0.01	0.01	99.50	H12	95	110	20	61.5
	0.10	0.40	0.01	0.01	99.50	H13	100	117	15	61.5
	0.10	0.40	0.01	0.01	99.50	H14	115	138	5	61.5
1370	0.10	0.25	0.01	0.01	99.70	H11	80	95	25	61.9
	0.10	0.25	0.01	0.01	99.70	H12	105	120	15	61.5
	0.10	0.25	0.01	0.01	99.70	H14	115	130	5	61.5

Elongation measured at 250 mm gauge length. Conductivity in % IACS at 20 °C. Chemical composition values are maximum % by weight.

Physical Constants (All 1xxx EC Grades)

Property	Value	Unit
Density at 20 °C	2703	kg/m ³
Temp. Coefficient of Resistance	0.00403	per °C
Coefficient of Linear Expansion	23 × 10 ⁻⁶	per °C
Modulus of Elasticity	68.9	GPa
Thermal Conductivity	230	W/m·K
Melting Range	646 – 657	°C

Wire drawn from UMPL EC grade rod. Properties per ASTM B233 / IEC 60889.

Product Code	Si (%)	Fe (%)	Cr (%)	Mn (%)	Al (%)	Dia. (mm)		Tensile (MPa)		Elong. (%)	
	Max	Max	Max	Max	Min	Min	Max	Avg	Ind.	Avg	Ind.
1350	0.10	0.40	0.01	0.01	99.5	0.227	1.25	170	160	--	--
	0.10	0.40	0.01	0.01	99.5	1.26	1.50	200	185	1.4	1.2
	0.10	0.40	0.01	0.01	99.5	1.51	2.00	195	185	1.5	1.3
	0.10	0.40	0.01	0.01	99.5	2.01	2.25	190	180	1.6	1.5
	0.10	0.40	0.01	0.01	99.5	2.23	2.50	185	175	1.6	1.5
	0.10	0.40	0.01	0.01	99.5	2.51	2.75	180	170	1.6	1.5
	0.10	0.40	0.01	0.01	99.5	2.76	3.00	175	165	1.7	1.6
	0.10	0.40	0.01	0.01	99.5	3.01	3.75	170	160	1.9	1.8
	0.10	0.40	0.01	0.01	99.5	3.76	5.25	165	160	2.1	2.0
	0.10	0.40	0.01	0.01	99.5	5.26	6.50	160	155	2.3	2.2
1370	0.10	0.25	0.01	0.01	99.7	0.227	1.25	170	160	--	--
	0.10	0.25	0.01	0.01	99.7	1.26	1.50	200	185	1.4	1.2
	0.10	0.25	0.01	0.01	99.7	1.51	2.00	195	185	1.5	1.3
	0.10	0.25	0.01	0.01	99.7	2.01	2.25	190	180	1.6	1.5
	0.10	0.25	0.01	0.01	99.7	2.26	2.50	185	175	1.6	1.5
	0.10	0.25	0.01	0.01	99.7	2.51	2.75	180	170	1.6	1.5
	0.10	0.25	0.01	0.01	99.7	2.76	3.00	175	165	1.7	1.6
	0.10	0.25	0.01	0.01	99.7	3.01	3.75	170	160	1.9	1.8
	0.10	0.25	0.01	0.01	99.7	3.76	5.25	165	160	2.1	2.0
	0.10	0.25	0.01	0.01	99.7	5.26	6.50	160	155	2.3	2.2

Elongation measured at 250 mm gauge length. Avg = average of test results; Ind. = individual test minimum. Chemical composition values are maximum % by weight. 1080A wire data available on request.

Reference Standards: ASTM B398 (6201), ASTM B317 (6101), Aluminium Association

AA 6201 -- High Strength Conductor Alloy

Element	Si	Fe	Cu	Mn	Mg	Cr	Zn	B	Al, min
Max %	0.50 – 0.90	0.50	0.10	0.03	0.60 – 0.90	0.03	0.10	0.06	Rem.

Si and Mg ranges are intentional alloying additions, not maximums. Other each 0.03% max, other total 0.10% max.

AA 6101 -- Electrical Bus Bar Alloy

Element	Si	Fe	Cu	Mn	Mg	Cr	Zn	B	Al, min
Max %	0.30 – 0.70	0.50	0.10	0.03	0.35 – 0.80	0.03	0.10	0.06	Rem.

Si and Mg ranges are intentional alloying additions. Other each 0.03% max, other total 0.10% max. Per ASTM B317.

Applications

The 6xxx series aluminium alloys combine magnesium and silicon for precipitation hardening, producing rod with significantly higher strength than EC grade while retaining good electrical conductivity.

AA 6201 is the standard alloy for manufacturing AAAC (All Aluminium Alloy Conductor) overhead transmission and distribution conductors, providing approximately twice the strength of EC grade 1350 at around 52.5% IACS conductivity.

AA 6101 is primarily used for electrical bus bars, switchgear components, and high-voltage substation conductors, offering an excellent balance of strength, conductivity, and formability.

Reference Standards: ASTM B398 (6201), ASTM B317 (6101)

AA 6201 -- Mechanical Properties by Temper

Temper	UTS, min (MPa)	Elong., min	Conductivity	Application
T81	310	3.0%	52.5% IACS	AAAC conductor
T6	290	8.0%	53.0% IACS	General structural
T4	170	16.0%	55.0% IACS	Formable condition

T81: Solution heat treated, cold worked and artificially aged. Values per ASTM B398.

AA 6101 -- Mechanical Properties by Temper

Temper	UTS, min (MPa)	Elong., min	Conductivity	Application
T6	200	8.0%	55.0% IACS	Bus bar, general
T61	140	10.0%	57.0% IACS	High conductivity
T63	150	8.0%	55.0% IACS	Standard bus bar
T64	140	12.0%	56.0% IACS	Balanced property

Values per ASTM B317. Temper designations T61-T64 indicate varying solution heat treatment conditions.

Rod Supply Condition

6xxx series aluminium rod is supplied in the as-cast (F temper) condition from the CCR line. The temper designations shown above reflect final product properties after downstream processing (solution heat treatment, ageing, and/or cold working) by the wire or conductor manufacturer.

Rod chemical composition is controlled to ensure the alloy responds correctly to heat treatment and achieves target mechanical and electrical properties in the finished product.

Reference Standard: ASTM B800, UL 44, NEC Article 310

AA 8176 -- Building Wire Alloy

Element	Si	Fe	Cu	Mn	Mg	Zn	Ti	Al, min
Max %	0.03 – 0.15	0.40 – 1.00	--	--	--	0.10	--	Rem.

Si and Fe ranges are intentional. Ga 0.03% max. Other each 0.05% max, other total 0.15% max. Per ASTM B800.

AA 8030 -- Building Wire Alloy

Element	Si	Fe	Cu	Mn	Mg	Zn	Ti	Al, min
Max %	0.10	0.30 – 0.80	0.15 – 0.30	--	0.05	0.05	--	Rem.

Fe and Cu ranges are intentional alloying additions. B 0.001 – 0.04%. Other each 0.03% max, other total 0.10% max.

AA 8017 -- Building Wire Alloy

Element	Si	Fe	Cu	Mn	Mg	Zn	Ti	Al, min
Max %	0.10	0.55 – 0.80	0.10 – 0.20	--	0.01 – 0.05	0.05	--	Rem.

Fe, Cu, Mg ranges are intentional. B 0.04% max, Li 0.003% max. Other each 0.03% max, other total 0.10% max.

NEC/UL Compliance

The AA-8000 series aluminium alloys were specifically developed for electrical building wire applications under NEC Article 310 and UL 44. These alloys use iron and copper additions (instead of the magnesium-silicon system used in 6xxx alloys) to achieve the required combination of strength, conductivity, creep resistance, and ductility needed for reliable termination performance in building wiring systems.

Reference Standard: ASTM B800

ASTM B800 -- Common Properties (All 8xxx Alloys)

ASTM B800 specifies identical mechanical and electrical requirements for all covered alloys (8017, 8030, 8176). The alloys differ in composition and resulting creep/stress relaxation performance, not in specification minimums.

Property	O Temper	H1X / H2X Temper
UTS (MPa)	59 - 111	103 - 152
Elongation, min	10.0%	1.0%
Conductivity, min	61.0% IACS	61.0% IACS

Values per ASTM B800-05. H1X = strain hardened only, H2X = strain hardened and partially annealed.

Key Advantages of AA-8000 Series

All three 8xxx series alloys share the following advantages over older EC grade aluminium building wire:

- Improved creep resistance under sustained load at connection points
- Higher ductility and elongation for easier installation and termination
- Conductivity equivalent to EC grade ($\geq 61.0\%$ IACS)
- Meets UL 44, NEC Article 310, and CSA C22.2 requirements
- Approved for use with Al/Cu rated connectors and terminals

Reference Standards: Aluminium Association Registration Records, ASTM B211

AA 1370 -- High Purity EC Grade

Element	Si	Fe	Cu	Mn	Cr	Zn	Ga	V+Ti	Al, min
Max %	0.10	0.25	0.02	0.01	0.01	0.04	0.03	0.02	99.70

B 0.02% max. Other each 0.03% max, other total 0.10% max. Higher purity than AA 1350 (Fe 0.25 vs 0.40).

AA 1100 -- Commercial Purity Aluminium

Element	Si+Fe	Cu	Mn	Mg	Cr	Zn	Ti	Al, min
Max %	0.95	0.05 – 0.20	0.05	--	--	0.10	--	99.00

Si+Fe combined maximum. Cu range is intentional addition. Other each 0.05% max, other total 0.15% max.

AA 1120 -- EC Grade Conductor Alloy

Element	Si	Fe	Cu	Mn	Mg	Zn	B	Al, min
Max %	0.10	0.40	0.05 – 0.35	0.01	0.20	0.05	0.05	99.20

Cu range is intentional (age-hardenability). Cr 0.01% max, Ga 0.03% max, V+Ti 0.02% max. Registered 1982, Australia (AS 1531).

AA 5005 -- Al-Mg General Purpose Alloy

Element	Si	Fe	Cu	Mn	Mg	Cr	Zn	Al, min
Max %	0.30	0.70	0.20	0.20	0.50 – 1.10	0.10	0.25	Rem.

Mg range is intentional alloying addition. Other each 0.05% max, other total 0.15% max. Per Aluminium Association.

Reference Standards: Aluminium Association, ASTM B211

AA 1370 -- Mechanical Properties by Temper

Temper	UTS (MPa)	Elong., min	Conductivity	Application
O	60 – 80	25.0%	62.0% IACS	EC conductor
H12	80 – 97	15.0%	61.5% IACS	EC conductor
H14	95 – 110	10.0%	61.0% IACS	EC conductor

Higher purity than AA 1350; slightly higher conductivity in annealed condition.

AA 1100 -- Mechanical Properties by Temper

Temper	UTS (MPa)	Elong., min	Conductivity	Application
O	75 – 105	25.0%	59.0% IACS	General purpose
H14	110 – 145	5.0%	57.0% IACS	Heat exchangers
H18	150 min	3.0%	57.0% IACS	High strength

Most widely used commercial purity alloy. Good formability, weldability, and corrosion resistance.

AA 1120 -- Mechanical Properties by Temper

Temper	UTS (MPa)	Elong., min	Conductivity	Application
O	75 – 105	23.0%	59.0% IACS	General purpose
T81	295 – 330	3.0%	53.0% IACS	AAAC conductor

AA 5005 -- Mechanical Properties by Temper

Temper	UTS (MPa)	Elong., min	Conductivity	Application
O	105 – 145	22.0%	52.0% IACS	Building products
H14	145 – 185	6.0%	52.0% IACS	Architectural
H34	145 – 185	7.0%	52.0% IACS	General purpose

Al-Mg alloy with moderate strength increase over 1xxx series. Good anodizing response and corrosion resistance.

Reference Standard: AWS A5.10, Aluminium Association

AA 4043 -- Chemical Composition

Element	Si	Fe	Cu	Mn	Mg	Zn	Ti	Al, min
Max %	4.50 - 6.00	0.80	0.30	0.05	0.05	0.10	0.20	Rem.

Si range is intentional (primary alloying element). Other each 0.05% max, other total 0.15% max. Per AWS A5.10/Aluminium Association.

AA 4043 -- Mechanical Properties

Property	Value	Unit
UTS (as-welded deposit)	145 - 227	MPa
Yield Strength (as-welded)	69 - 190	MPa
Elongation	5 - 12	%
Shear Strength	120	MPa
Melting Range	574 - 632	°C

Applications

AA 4043 is the most widely used aluminium welding filler alloy. The high silicon content (4.5 - 6.0%) provides excellent fluidity, reduced hot cracking sensitivity, and good weld bead appearance.

Primary applications include MIG and TIG welding of 6xxx series aluminium structures, automotive components, pressure vessels, and general fabrication. The rod is drawn to welding wire diameters (typically 0.8 - 1.6 mm) by downstream wire manufacturers.

UMPL supplies AA 4043 rod as feedstock for welding wire manufacturers who then draw, clean, and spool the wire to finished specifications per AWS A5.10.

Quick reference for alloy selection across all series

Master Alloy Comparison

Alloy	Series	Al min%	Key Element	UTS Range (MPa)	Conductivity (% IACS)	Primary Application
1350	1xxx	99.50	--	59 - 152	61.3 - 61.8	EC overhead conductors
1370	1xxx	99.70	--	60 - 110	61.0 - 62.0	High purity EC conductors
1100	1xxx	99.00	Cu 0.05-0.20	75 - 150	57.0 - 59.0	General purpose, packaging
1120	1xxx	99.20	Cu 0.05-0.35	75 - 330	53.0 - 59.0	AAAC conductors (AS 1531)
4043	4xxx	Rem.	Si 4.50-6.00	145 - 227	--	Welding wire feedstock
5005	5xxx	Rem.	Mg 0.50-1.10	105 - 185	52.0	Building products
6201	6xxx	Rem.	Mg+Si	170 - 310	52.5 - 55.0	AAAC conductors
6101	6xxx	Rem.	Mg+Si	140 - 200	55.0 - 57.0	Bus bars, switchgear
8176	8xxx	Rem.	Fe 0.40-1.00	59 - 152	61.0	Building wire (NEC)
8030	8xxx	Rem.	Fe+Cu	59 - 152	61.0	Building wire (NEC)
8017	8xxx	Rem.	Fe 0.55-0.80	59 - 152	61.0	Building wire (NEC)

Alloy Selection Guide

- For overhead transmission conductors (AAC, ACSR): AA 1350, AA 1370
- For overhead distribution conductors (AAAC): AA 6201, AA 1120
- For electrical bus bars and switchgear: AA 6101
- For building wire (NEC/UL compliant): AA 8176, AA 8030, AA 8017
- For welding wire feedstock: AA 4043
- For general purpose and packaging: AA 1100
- For building products and architectural: AA 5005

UTS values shown represent the full temper range for each alloy. Conductivity values represent typical minimum values achievable in standard tempers. For detailed temper-specific properties, refer to the individual alloy pages in this catalogue.

Packaging

The material is supplied on coils with the following dimensions. Each coil is secured onto a wooden pallet with steel strapping and protective wrapping to prevent surface damage and oxidation during transit and storage.

Metric	9.5 mm Rod	12 mm Rod
Inner Diameter	560 mm	560 mm
Outer Diameter	1300 mm	1300 mm
Height	850 mm	850 mm
Nominal Weight	2000 kg	2000 kg

Coil dimensions and weights are nominal values. Custom coil weights and packaging configurations are available on request. All coils are identified with manufacturer tags showing alloy grade, temper, diameter, lot number, and net weight.