

COMPLETE PLANTS FOR PRODUCING EC GRADE AND COMPLEX ALUMINIUM ALLOYS ROD

10 Technology

Aluminium rod is everywhere around us. The overhead conductors made out of aluminium rod bring the electricity in our houses and our factories from the power generation plants. The insect screens protecting the windows of houses are again made out of aluminium rod and yet several screws of our cars have been made starting from aluminium rod and ... we could go further analyzing the various items of our daily lives which have been made starting from aluminium rod.

However, amongst the various applications of aluminium rod, the electric sector (transportation and distribution of electric energy) is the major consumer of aluminium rod. Statistics and data banks agree that 83%÷85% of aluminium rod produced worldwide is devoted to electric applications while the balance is consumed by the industry for various mechanical applications, including welding alloys.

The availability of aluminium rod, properly alloyed, goes hand-by-hand with the growth of the demand of electric energy and therefore with the growth and development of any country.

At the present time, Properzi company has commissioned some 300 complete plants in more than 50 countries but the pioneer time started long back, in a very dark time, in 1949, just a couple of years after the foundation of the company. The method of continuous cast and direct rolling, invented by Mr. Ilario Properzi was really disruptive: from molten metal to wire in one minute!

The new technology designed by Mr. Properzi offered so many technological and economic advantages when compared to the old method of Belgian Loop Mills, also from the safety point of view, that in 1960 there were already some 50 Properzi Al Rod Lines in operation in 19 countries. At that time the overall production of aluminium was in the range of five million tons and the total annual output of those 50 Al rod lines was optimistically 500,000 tons; five modern CCR lines of 15 tph each give the same output today!

For many many years, aluminium rod has been considered a commodity. In other words, a product that is quoted on the Stock Exchange with practically constant price on the world market and with standard characteristics. In fact, the vast majority of the rod on the market was AA1350 and AA1370 and in a few cases the rod producers delivered to the market AA6201. Complex alloys rod of 5xxx series were really an exception.

In the past ten years the most powerful driving forces of the aluminium rod, as we said the cable makers and the car makers, have requested more and more specialized products such as the EC grade H11 or the AA8176 or the complex welding alloys such as AA5356 and yet large diameter both in EC grade and hard alloys; a true revolution!

The table A summarizes what is available on the market today, certainly produced through Properzi machinery, and the field of application.

TABLE A

ALLOY ROD DESIGNATION	COMMERCIAL APPLICATION				
1050 1100 1350; 1370 2011; 2014; 2017	RIVETS (NON-AIRCRAFT) TIE AND UTILITY WIRE CONDUCTORS SCREW MACHINE STOCK	IMPACT EXTRUSION FASTENERS		RIVETS	
3003; 3105	FENCE	IMPACT EXTRUSION			
4043; 4047	WELDING WIRE				
5005 5050; 5051; 5052 5056 5086 5087; 5183; 5356; 5556 5154; 5754	CONDUCTORS FASTENERS ZIPPER WIRE ZIPPER WIRE WELDING WIRE WELDING WIRE	RIVETS (NON-AIRCRAFT) INSECT SCREEN FASTENERS INSECT SCREEN	TIE AND UTILITY ANTENNAS RIVETS (NON NAILS) RIVETS (NON TIE AND UTILITY WIRE)		
6056 6061 6063 6082 6101; 6201	IMPACT EXTRUSION FASTENERS FASTENERS FASTENERS CONDUCTORS	RIVETS (NON-AIRCRAFT) IMPACT EXTRUSION RIVETS (NON-AIRCRAFT)	NAILS NAILS	FENCE	IMPACT EXTRUSION
7075	SCREW MACHINE STOCK				
8017; 8030; 8175; 8176	CONDUCTORS				
TAL; KTAL; XTAL; ZTAL	CONDUCTORS				
DEOX	ALUMINIUM CONTENT ≥ 98%				



**Aluminium coils ready to be processed –
By courtesy of Conalum (Mexico)**



Sketch of new Track & Belt Caster with Bar Cooler

We have good reasons to believe that in the nearest future this market's trend in requiring complex alloys will grow at a steady rate; this would be the future.

Properzi can offer a complete range of aluminium rod plants from the smallest ones sized for 10,000 tpy, to the extra-large ones sized for 100,000 tpy.

The complete range of CCR Al rod lines is displayed in the Table B.

TABLE B

Output rate	tph	Expected output 5 days/week	Expected output 7 days/ week
SMALL	1.5	7,500	10,000
	2.5	12,500	16,500
	3.5	17,500	23,000
MEDIUM	4.5	22,000	30,000
	5.0	24,500	33,000
	6.0	30,000	40,000
LARGE	8.0	40,000	53,000
	10.0	Not suggested	66,000
EXTRA LARGE	12.0	Not suggested	79,000
	13.0	Not suggested	85,000
	15.0	Not suggested	100,000

For SMALL and MEDIUM plants Properzi has tailored the very efficient vertical melting furnace called "Vert-Melt". Such furnace is not available for LARGE and EXTRA LARGE CCR rod lines since, in general, such plants are equipped with large holding furnaces which are fed with liquid metal coming from pot lines.

Properzi has also a very wide range of coilers for rod packaging. In summary:

- >> The classic package of 2.5 t, both in European and American standard
- >> The jumbo coiler, designed to produce coils of 3 t, again in European and American standard
- >> The super-jumbo coiler which has been delivered mainly in North America where the coils have 3.7 t weight and internal diameter of 780 mm

All the above are solutions for tight coils either in random or pitch-to-pitch mode.

For small and medium CCR lines is also available the packaging in loose coils for in-house transportation and use. In case it is required any packaging for export, Properzi offers the off-line recoiler.

In addition to the Properzi "classic" aluminium plants described above, some years back Properzi launched a new generation of CCR lines called E-Type (where "E" stands for Essential). Such lines, ranging from 1.6 tph through 4 tph, have been specially designed for producing EC grade and eventually AA 6201. The rod is in general coiled in loose coils, ideal for the in-house use of the produced rod. The annual output rate of such CCR lines ranges from 10,000 tpy through 26,000 tpy. The furnace set is part of Properzi supply.

It is true that now-a-days there are many new suppliers who claim to have sufficient experience and know-how, but, diligently, we believe that our seventy years' experience cannot be duplicated by reverse engineering.

During the years the name Properzi has become synonymous of:

- >> Specialized engineering for layouts, foundation drawings, etc., and for tailoring special technical solutions, if requested
- >> Machinery tailor made and designed for life
- >> Lowest OpEx (Operational Expenditures)
- >> Highest OEE (Overall Equipment Efficiency)
- >> First class components (hydraulic, pneumatic, electrics etc.) and friendly use control system
- >> High rod quality and high grade of reparability of the quality
- >> Flexible machinery
- >> Unparalleled technical assistance for training, commissioning and start-up and ... many other advantages that you can experiment joining our large family

Properzi is available to supply such plants on EPC (Engineering, Procurement, Construction) basis so that the Buyer is only minimally involved with the installation of the plant.

By C.M.B.

Some of the many applications of aluminium rod (insect screens, clips, buttons, wire)

