

COMPLETE ZINC WIRE PLANTS; THE EVERGREEN TECHNOLOGY AND EQUIPMENT FOR MAKING WIRE FOR SPRAY METALLIZATION

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The most important application of zinc comes from its chemical properties, for instance its high resistance to atmospheric corrosion: an adherent zinc layer applied on a steel surface gives the latter a very high resistance to atmospheric corrosion. Typical applications range from simple treatments of handrails to complete treatments of petrochemical works, bridges and pylons. The main application is galvanic coating.

Among the different systems available to protect steel by means of zinc, Thermal Spray, often called Metallized Coatings, is remarkably interesting due to zinc's ductility and ease of applications both in industrial mass-produced processing and handicraft for maintenance and renovation.

With the application of sealer coatings which retard the dissolution process, the arc sprayed coating life is extended beyond that expected for galvanizing. The amount of zinc exposed for dissolution is controlled by the sealer thereby providing, in some cases, over five decades of corrosion protection to the steel. Zinc aluminium alloys are also used for galvanic protection of steel and these materials can grant longer life protection in highly corrosive environments. The dissolution of ZnAl alloys is less than pure zinc; however, in the more aggressive anodic couple, they afford great protection of the underlying steel.

These metallized coatings which use zinc and zinc alloys are essential to the manufacture of many types of products and components in various fields including automotive, electronic, tube & pipe products, etc. These thermally sprayed zinc-based alloy wire coatings are also applied on critical infrastructure throughout the world such as bridges, overhead power distribution towers, above ground piping and storage tanks, light poles, and locks & dams just to name a few.

Zinc wire and zinc alloy wire is used to apply these zinc coatings on steel products in order to protect them against corrosion. SHG (Special High Grade) zinc is of the highest purity (99,995% according to EN 1179 - "Z1") and is used in the production of zinc wire and zinc alloy wire.

The application of zinc coatings by spraying is a method of anticorrosive protection. Metallized coatings have the following advantages over hot dip galvanizing or electroplating:

- >> Possibility to metallize structures at the construction area
- >> No dimensional limitations regarding the dimensions of the coated elements
- >> Possibility to mend the coating on construction site (welded areas, mechanically damaged areas, etc.)
- >> High resistance against mechanical defects
- >> Thickness can be easily adjusted to suit the operational requirements
- >> Eliminates the risk of thermal deformations of the protected elements

The market must offer ample quantities of either pure zinc or zinc-aluminium (up to 15% Al) alloy wire with precise physical, mechanical and geometrical properties in diameters ranging from 1.2 to 3.2 mm and above.

Continuus-Properti S.p.A. is strongly present in this market segment, as we have supplied zinc CCR lines ranging from 1 tph up to 5 tph and above to meet our customers' specific needs.

Output rate	tph	Expected output 5 days / week	Expected output 7 days / week
CCR ZN 1	1.0	4,900	6,600
CCR ZN 2	2.0	9,900	13,000
CCR ZN 3	3.0	14,700	19,600
CCR ZN 5	4.0	24,500	32,700

The expected output is referred to pure zinc and 48 working weeks per year and 85 % OEE.

The above listed lines are configured in order to permit the production of both zinc and zinc alloy wire with minimum modification and with dedicated furnaces. The furnaces used for zinc alloys cannot be used for pure zinc if not meticulously washed.

**Complete Zinc Line –
By courtesy of Khosla Engineering (India)**





The product: zinc wire

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A zinc wire manufacturing system includes:

1. One or two melting/holding tiltable or static furnace(s). The furnace(s) can be gas fired or electrical induction type.
2. The Properzi casting wheel (horizontal casting).
3. The rod rolling mill monoblock with nine/thirteen stands. The rolling sequence is round-triangle and the final wire/rod diameter can be approximately 3.5/5.5 mm. The rolling mill is synchronized with the casting machine through a counterweight type bar sensor. The stands are Micro Model and each one includes 3 work rolls. The high plasticity of the zinc, combined with the low working temperatures and the low speeds of the rolling stands, allows a remarkably long life for the work rolls, on the order of years.
4. The rod coiler to collect the wire/rod into a basket; the resulting coil will weigh approximately 0.5 to 1.5 tons. The coiler includes a rotary loop-forming pipe driven by a motor which is synchronized to the rolling mill.
5. The drawing machine(s) to get the final diameters and the packaging department.

The compactness, simplicity, robustness and automation of the Properzi CCR Line, as well as the minimal maintenance requirement which does not need a continuous presence of the operator, allows the entire operation to be carried out by a few operators per shift.

The production of Zn and ZnAl wire can be a very profitable business when considering the wire premium, the ingot premium and an affordable CapEx which permits a very short payback period (less than 3 years for a 1 or 2 tph line).

The OpEx (Operational Expenditures) of these lines is minimal considering they generally require only 2 persons per shift and incur low maintenance costs.

Investing in the Properzi turnkey system for the production of Zn and ZnAl wire can be very lucrative considering the longevity of these machines which have been known to operate for more than 40 – 50 years.

Properzi is also 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 M.N.



Zinc coating application