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" PROCESS FOR THE PREPARATION OF NOVEL ZINC-SODIUM
SILICATE PRIMER FOR PROTECTION OF STEEL STRUCTURES."

Council of Scientific and Industrial Research
Rafi Marg, New Delhi- 1, India.

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Registration of Societies Act. Act XXI of 1860.

The following specification particularly
describes and ascertains the nature of this
invention and the manner in which it is to be
performed.

PRICE. Rs 2.00

This is an invention by Kunnattithidal Santhanam RAJAGOPALAN, Subbajaladar GUNUVIATH and Meyyappa SUNDARAM, Scientists, all of the Central Electrochemical Research Institute, Karaikudi-623 006, India, all Indian Citizens.

This invention relates to a process for the preparation of zinc-sodium silicate primer for protection of steel structures.

At present it is a common practice, to use red oxide/zinc chromate primer and red lead primer for the protection of steel structures exposed to atmosphere.

These primers are not intended to give protection by themselves as these have to be followed by finishing paints.

The main object of this invention is to prepare a novel primer for corrosion protection by barrier effect and electrochemical method. The coating obtained is hard and abrasion resistant.

The main finding of the invention is that when zinc dust is incorporated in sodium silicate solution along with red lead and potassium silico fluo^xide a novel protective primer is obtained. The primer can be applied on to metal surface even under wet conditions. The hard and abrasion resistant coating formed on the surface can be easily removed by acidic wash.

The coating which dries quickly forms a hard abrasion resistant coating. It can be applied in humid atmospheres and on wet surfaces.

Furthermore, the primer thus prepared gives both barrier protection and cathodic protection to the base metal. The primer which can be applied under humid conditions or on wet surfaces gives a thick, hard abrasion resistant coating. The period of protection offered by the primer is more than that of conventional primer in combination with finishing paints.

The invention, thus provides a process for the preparation of a novel primer for steel structures, comprises reacting zinc dust in an aqueous sodium silicate solution, with red lead and potassium silico-fluoride and stirring the reaction product with water to obtain a brushable consistency.

Furthermore, the reaction product obtained may contain 70-90% pure zinc dust of particle size of 300 mesh and 5-25% of the sodium silicate solution and may contain 1:1 to 1:2.2 to 3.5 parts of $\text{Na}_2\text{O} : \text{SiO}_2$. The reaction mixture may contain from 1-4% Red lead and 1-5% of Potassium silico-fluoride.

The primer product obtained by this process is a coating composition similar to any paint product in use and is not a mere admixture of ingredients. The invention is further illustrated by the following examples.

EXAMPLE 1

50 gm of sodium silicate ($\text{Na}_2\text{O} : \text{SiO}_2 = 1:2.1-3.5$) are dissolved in 30 ml of water. To this 20 gm of red lead are added and stirred well. Zinc dust (300 mesh) 450 gm are added to this solution and stirred for 30 minutes. If necessary, few ml of water are added to get a brushable consistency.

EXAMPLE 2

50 gm of sodium silicate ($\text{Na}_2\text{O}:\text{SiO}_2 = 1:2.1 - 3.5$) are dissolved in 30 ml of water and to this are added 20 gm of red lead, 10 gm of potassium silico-fluoride, 450 gm of zinc dust. Stirred well for 30 minutes. Brushable consistency is obtained by adding few ml of water.

EXAMPLE 3

400 gm of zinc dust are added to a solution containing 160 gm of sodium silicate ($\text{Na}_2\text{O}:\text{SiO}_2 = 1:2.1-3.5$) and red lead 20 gm.

The primer thus prepared can be applied on pickled surface. This can be applied over wet surfaces also. It has been observed under immersed conditions in distilled water and 3% NaCl at room temperature that there is no brown rust formation along the scratches and other areas. It gives sufficient negative potential in 3% NaCl under immersed condition. The protection offered by this primer has been found to be superior to other conventional primers at Mandapam Camp atmosphere during its one year exposure. The protection offered is further enhanced by application of finishing paint. No rusting was noticed even at the end of 12 months.

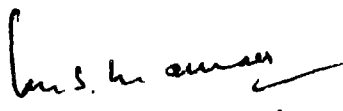
Performance of primer paints at the end of
12 months at Mandapam Camp.

Sl. No.	Name of primer	Merit values for 100	Visual observation.
1.	Red oxide zinc chromate	30	The surface was almost covered with rust
2.	Red lead red oxide	40	Rusting nearly all over
3.	Silicate primer	70	White corrosion product all over. Red brown rusting along the edges and at few places here and there.

We claim: -

1. Process for the preparation of a novel primer for steel structures comprising reacting zinc dust in an aqueous sodium silicate solution, with red lead and potassium silico-fluoride and stirring the reaction product with water to obtain a brushable consistency.
2. Process as claimed in claim 1 wherein the 70-90% of zinc dust of particle size 30 mesh is added to 5-25% of aqueous sodium silicate solution having a $\text{Na}_2\text{O}:\text{SiO}_2$ ratio of 1:2.2 to 3.5 parts and admixed with 1-4% of red lead and 1-5% of potassium silico fluoride.

Dated the 25th day of January, 1978.


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