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" IMPROVEMENTS IN OR RELATING TO THE PREPARATION OF WATER BORNE SELF CURING ZINC SILICATE COATINGS".

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH, Rafi Marg, New Delhi-110001, India, an Indian registered body incorporated under the Registration of Societies Act (Act XXI of 1860).

The following specification describes the nature of this invention.

PRICE : TWO RUPEES

This is an invention by Subbiah Guruviah, Meyyappa Sundaram, and Kummattithidal Santhanam Rajagopalan scientists alll from Central Electrochemical Research Institute, Karaikudi, and Indian citizens.

The invention relates to improvements in or relating to the preparation of water borne self curing zinc rich silicate coatings.

Hitherto zinc rich paints have been produced in both inorganic and organic medium in other countries and the technology is not known in India. They are mainly used for the protection of steel structures at marine atmospheres, nuclear reactors, marine hulls, bridges, pipe exterior, tank exteriors, offshore platforms, decks. These primers have not been tried extensively in out door as welding primer which can be used for welding painted steel structures without difficulty.

The object of the present invention is to obviate the disadvantage by incorporating zinc dust in sodium silicate medium so as to obtain a highly protective and weldable coatings. It can be applied in humid atmosphere and the coatings obtained are hard and abrasion resistance and after welding, it is slag free.

The main finding of the invention relates to preparation of a primer which could be used for corrosion protection and the coated sections are not affected during fabrication by welding by reacting zinc dust (3-5 u size) containing suitable additives such as fumed silica, chromates, talc, red lead etc. with sodium silicate (Na_2O : SiO_2 = 1 : 3) solution of 1:5 = Na_2SiO_3 : H_2O

containing chromates, allowing the reaction to be completed by grinding the products, adjusting the consistency by adding distilled water as solvent to obtain the primer.

To these ends the invention broadly consists in reacting zinc dust 92-95% red lead 3-4% fumed silica 0.5-1% with sodium silicate solution (1:3 to 1:3.5) containing potassium chromate 1% to 1.5% and grinding or mixing them to get an uniform paste and adjusting the consistency by adding distilled water to get a prefabrication and welding primer which gives high degree of protection to structure in marine and other aggressive environments.

The following typical examples are given to illustrate the invention.

Example-1

Sodium silicate (1:3), 115 gms were dissolved in 560 gms of distilled water and 1 gm of potassium chromate was added to this solution. This is the binder. 2540 gm of zinc dust (3-5 u) 105 gm of red lead, and 28 gm of fumed silica were mixed well in a ball mill. This forms the pigment portion. The pigment is added to the solution slowly with constant stirring and allowed to react for 30 mts. At the end the consistency is adjusted using distilled water. This is then applied on sand blasted steel by brush or spray.

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Sodium silicate (1:3) 115 gm were dissolved in 560 gm of distilled water and this forms the binder portion. 2535 gms of zinc dust (3-5 u) and 105 gms of red lead were mixed well in a ball mill and this is the pigment. 4.5 parts of the pigment are added slowly to 1 part of the binder and allowed to react for 30 minutes by grinding the material to a paste or mixing them well to get an uniform, free flowing coating material.

The primer prepared by the above method was applied by brush on sand blasted steel surfaces and the behaviour of the coating for weldiability, top coatability and for corrosion resistance properties by accelerated tests and electrochemical tests were carried out.

The coating passes the weldability test as per American Welding Society Specification D 20-66. Top coats are compatible. No red brown rusting was observed even after 30 days of immersion test in 3% sodium chloride solution or salt spray test. The potential of the coating remained well above the protective potential viz. -0.76 V VS SCE in 3% NaCl solution and the galvanic current was more than 500 uA even after 30 days of immersion in 3% NaCl solution. The exposure studies at Mandapam Camp show that the coating is free from corrosion and other defects even at the end of one year. The developed primer compares well with the imported primer in all physical and chemical properties tests.

The following are the main advantage of the invention:

1. The coating has no determental effect on weld strengths. The coating has minimum burn back from weld.

2. Compatible with other top coat paints eg. epoxy.

3. Prevents corrosion of plate stock for one year at 75 u zinc silicate coatings alone

4. It is water based and hence pollution free. Non flamable.

5. It dries hard, immediately and can be handled immediately for subsequent operation.

Dated this 9th day of Aug 1984.

(S.KUMAR)
ASSISTANT PATENTS OFFICER
COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

THE PATENTS ACT, 1970

160274

COMPLETE SPECIFICATION

(Section—10)

" IMPROVEMENTS IN OR RELATING TO THE PREPARATION OF WATER BORNE SELF CURING ZINC SILICATE COATINGS".

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH, Rafi Marg, New Delhi-110001, India, an Indian registered body incorporated under the 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 :—

This is an invention by Subbiah Guruviah, Meyyappa Sundaram, and Kummattithidal Santhanam Rajagopalan scientists all from Central Electrochemical Research Institure, Karaikudi, and Indian citizens.

The invention relates to improvements in or relating to the preparation of water borne self curing zinc rich silicate coatings.

Hitherto zinc rich paints have been produced in both inorganic and organic medium in other countries and the technology is not known in India. They are mainly used for the protection of steel structures at marine atmospheres, nuclear reactors, marine hulls, bridges, pipe exterior, tank exteriors, offshore platforms, decks. These primers have not been tried extensively in out door as welding primer which can be used for welding painted steel structres without difficulty.

The object os the present invention is to obviate the disadvantage by incorporating zinc dust in sodium silicate medium so as to obtain a highly protective and weldable coatings. It ~~can be applied in humid protective and weldable coatings. It~~ can be applied in humid atmosphere and the coatings obtained are hard and abrasion resistance and after welding, it is slag free.

The main finding of the invention relates to preparation of a primer which could be used for corrosion protection and the coated sections are not affected during fabrication by welding by reacting zinc dust containing suitable additives such as fumed silica, chromates, talc, etc. with sodium silicate (Na_2O : SiO_2 = 1 : 3) solution of 1:5 = Na_2SiO_3 : H_2O containing chromates,

allowing the reaction to be completed by grinding the products, adjusting the consistency by adding distilled water as solvent to obtain the primer.

Accordingly, the present invention provides a process for the preparation of water borne self current zinc silicate coating for protection of steel structures which comprises reacting zinc dust and red lead in 1:1 sodium silicate solution containing an additive such as hereindescribed and grinding the mixture to form a paste.

The additives used may be selected from fumed silica, chromates, tals etc. The amount of the additive may vary from 0.01 to 1.5% by weight.

In an embodiment of the invention zinc dust 92-95%, red lead 3-4% fumed silica 0.5-1%, are reacted with sodium silicate solution 1:3 to 1:3.5 containing potassium chromate 1% to 1.5% grinding or mixing them to get an uniform paste and adjusting the consistency of the mixture by adding distilled water.

The prefabrication and welding primer thus produced gives high degree of protection to structure in marine and other affressive environments.

The following examples are given to illustrate the invention which should not however to Considered as limiting the scope of the invention.

Example-1

Sodium silicate (1:3), 115 gms were dissolved in 560 gms of distilled water and 1 gm of potassium chromate was added to this

solution. This is the binder. 2540 gm of zinc dust (3-5 u) 105 gm of red lead, and 28 gm of fumed silica were mixed well in a ball mill. This forms the pigment portion. The pigment is added to the solution slowly with constant stirring and allowed to react for 30 mts. At the end the consistency is adjusted using distilled water. This is then applied on sane blasted steel by brush or spray.

Example 2

Sodium silicate (1:3) 115 gm were dissolved in 560 gm of distilled water and this forms the binder portion. 2535 gms of zinc dust (3-5u) and 105 gms of red lead were mixed well in a ball mill and this is the pigment. 4.5 parts of the pigment are added slowly to 1 part of the binder and allowed to react for 30 minutes by grinding the material to a paste or mixing them well to get an uniform, free flowing coating material.

The primer prepared by the above method was applied by brush on sane blasted steel surfaces and the behaviour of the coating for weldiability, top coatability and for corrosion resistance properties by accelerated tests and electrochemical tests were carried out.

The coating passes the weldability test as per Americal Welding Society Specification D 20-66. Top coats are compatible. No red brown rusting was observed even after 30 days of immersion test in 3% sodium chloride solution or salt spray test. The potential

of the coating remained well above the protective potential viz. -0.76 V VS SCE in 3% NaCl solution and the galvanic current was more than 500 uA even after 30 days of immersion in 3% NaCl solution. The exposure studies at Mandapam Camp show that the coating is free from corrosion and other defects even at the end of one year. The developed primer compares well with the imported primer in all physical and chemical properties tests.

The following are the main advantage of the invention:

1. The coating has no determental effect on weld strengths. The coating has minimum burn back from weld.

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3. Prevents corrosion of plate stock for one yeat at 75 u zinc silicate coatings along.

4. It is water based and hence pollution free. Non flamable.

5. It dries hard, immediately and can be haldled immediately for subsequent operation.

We claim:

1. A process for the preparation of water borne self curing zinc silicate coating for protection of steel structures which comprises reacting zinc dust and red lead in 1:1 sodium silicate solution containing an additive such as hereindescribed and grinding the mixture to form a paste.

2. A process as claimed in claim 1 wherein 92-85% by weight of zinc dust and 3-4% by weight of red lead are used.

3. A process as claimed in claim 1 and 2 wherein the additives used are selected from fumed silica, fhromates, talc etc.

4. A process as claimed in claim 3 wherein potassium chromate is ysed as the additive.

5. A process as claimed in any of the preceeding claim wherein 0.01 to 1.0% by weight of the additive is used.

6. A process as claimed in claim 5 wherein fumed silica is used as the additive and it is used in a amount of 0.5 to 1%.

7. A process as claimed in any of the preceeding claim wherein the zinc has the size 3-5.

8. A process for the preparation of water brone self curing zinc silicate coating for protection of steel structures substantially as herein descrined with reference to the Examples.

Dated this 25th day of May, 1985.

Sd/-
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