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" A PROCESS FOR THE PREPARATION OF A COMPOSITION USEFUL FOR COATING RUSTED SURFACES".

COUNCIL OF SCIENTIFIC & 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 :-

PRICE : TWO RUPEES

This is an invention by Subbiah Guruviah, Chakravarthi Rajagopal, Meyyappa Sundaram and Kummattithidal Santhanam Ragapalan, scientists, all from Central Electrochemical Research Institute, Karaikudi-623006, Tamil Nadu, India and all Indian citizens and relates to the treatments for partially rusted steel structures before painting an improved coating composition therefor.

Rust converters are already known in the art and our prior Indian Patent No. #42923 describes an improved process for painting/coating a rusted steel structures which comprises hand cleaning the rusted steel surface, applying basic coating composition containing heavy metal carbonate, non-catalytic acids, a metal powder and phosphoric acid dissolved in water, on the hand cleaning partially rusted steel surface drying the same and painting the treated steel structure with a desired paint or coating material.

This method can be used for the treatment of uniformly rusted surfaces only but is not able to convert the partially rusted steel surfaces. Hence it has become necessary for further research and development to modify the known rust converting formulation for use on to partially rusted surface.

The object of the present invention is to obviate the disadvantage of costly surface preparation before painting, by developing a composition which can be applied on hand cleaned and/or partially rusted steel surface, which will convert the adherent rust into a protective coating and the coating thus formed serves as a satisfactory base for painting.

The main advantages of the invention are that complete removal of rust is not required, the treatment gives temporary protection till the application of primer, this method of surface preparation is cheaper compared to complete removal of rust or complete removal of rust and phosphating, and that all the raw materials are easily available.

Accordingly, the present invention provides a process for the preparation of a composition useful for coating rusted surfaces which comprises reacting Phosphoric acid (15 - 45 gm), Iron powder (6 - 11 gm), Acetic acid (5 - 10 ml), Manganese carbonate (1.5 - 2 gm), Oxidising agent like Sodium nitrate or KMnO_4 (0.3 - 0.5 gm) and Water (70 - 30 ml).

The invention broadly consists of incorporation of a heavy metal carbonate (1.5 - 2 gm) like manganese carbonate, lead carbonate, organic acid like formic, acetic acid (5-9 ml) oxidising agent like potassium permanganate (0.5 - 1 gm), or sodium nitrate (0.3 - 0.5 gm) and a metal powder, e.g. iron, or zinc of (6 - 11 gm) - 300 mesh in a solution of phosphoric acid (85%) in concentration range 15 - 45%.

The composition thus obtained has unique properties, not associated with the individual ingredients.

The composition prepared by the process of the invention, forms a coating on the steel surfaces in combination with the rust therein and the thus treated surfaces can be used for purposes of painting.

The following examples illustrate the invention:

Example-I

40 ml of water is taken in a beaker to which 26 ml of phosphoric acid is added and stirred. 1.7 gm manganese carbonate is added with stirring till it is dissolved. Then 0.2 gm of KMnO_4 is added to this solution. Finally 8 ml of acetic acid is added. To this solution 9 gms of iron powder of - 300 mesh is added and stirred well to get the composition.

This is applied on partially rusted mild steel surface that has been cleaned by hand cleaning method with brush and examined after an hour. A black, adherent and uniform coating is obtained.

Example-II

0.3 -0.5 gm of sodium nitrate is added in the place of potassium permanganate while other constituents remain the same as in Example I.

Example-III

In the case of rusted surfaces, with mill scale, the mill scale is first removed by rust and scale removing jelly described in our prior Indian Patent No.139366 and allowed to weather for 24 hours to get uniform rusting. Then either the composition described in the examples I or II is applied on the surface to obtain a uniform conversion, coating over which further painting can be done.

Rusted mild steel panels and partially rusted steel panels cleaned by hand cleaning are coated with the above formulation.

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The drying time, adhesion and coverage were determined and it was evaluated by accelerated tests. Adhesion of the converted film as well as the paint over converted surface was tested by stripping the cello tape applied to the surface with 4 kg. weight. The coating remained in tact.

The composition thus eliminate the use of other methods of surface preparation which are costly and time consuming. This composition produces an insitu conversion coating even on partially rusted surfaces.

The physical properties of the treated surfaces with the composition of this invention are described herein:

Table-1

Physical properties of the newly developed product

	Nature of coating	Drying time	Coverage per litre	Adhesion
Example I	Uniforms, black coating	60 mts - 90 mts	80 - 100 sq. ft.	Good
Example II	-do-	-do-	-do-	-do-
Example III	-do-	-do-	-do-	-do-

A large number of squares are produced by a sharp nail on the coated surface. A cello tape is fixed on the squares thus made and 4 kg. weight is placed on the padding material over the cello tape. After some time the weight is removed and the tape is suddenly pulled off and the scratched area is examined for peeling off the coating. If there is no peeling off, then the

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coating is considered as an adherent one. The coated panels were immersed in a beaker containing distilled water and 3% NaCl for 40 days. The treated and painted panels were exposed to 3% NaCl solution in Cannings Salt Spray Chamber for 25 days.

Table 2

Accelerated and exposure tests for Corrosion Resistant
(40 days)

No.	Surface treatment	Distilled water immersion	3% Sodium chloride immersion (24 hrs)	Salt fog exposure studies
1.	Rusted panels and converted	No rust spots	No rust spots	Remained Good
2.	Partially rusted and converted	No rust spots	No rust spots	Remained Good

We Claim

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1. A process for the preparation of a composition useful for coating rusted surfaces which comprises reacting Phosphoric acid (45 - 45 gm), Iron powder (6 - 11 gm), Acetic acid (5 - 10 ml), Manganese carbonate (1.5 - 2 gm), Oxidising agent like Sodium nitrate or KMnO_4 (0.3 - 0.5 gm) and Water (70 - 30 ml).
2. A process as claimed in claim 1 which comprises reacting Phosphoric acid (45 gm), Iron powder (11 gm), Sodium nitrate or Potassium permagnate (0.5 gm), Manganese carbonate (2 gm), Acetic acid (9 ml) and Water (40 ml).
3. A process for the preparation of a composition useful for coating rusted surfaces substantially as herein described and illustrated.

Dated this 9th day of August 1984



(N.R. SUBBARAM)

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