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PROVISIONAL SPECIFICATION

“A PROCESS FOR PRODUCING A NEW ACIDIFIED SODIUM PHOSPHATE SOLUTION SUITABLE FOR PHOSPHATING OF METALLIC SURFACES OR RUSTED STEEL SURFACES”

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH, RAJI MARG, NEW DELHI-1, 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 :—

This is an invention by KUMMATTITHIDAL SANTHANAM RAJAGOPALAN, RENGACHARI SRINIVASAN, Scientists, CHAKRAVARTHI RAJAGOPAL, S. S. A., NARAYANASWAMI KRITHIVASAN S. S. A., MELAYERIYAT KOCHU JANAKI, MUTHUVEERAN SETHUKUMARI and PORAIYAR SARANGAPANI MOHAN, Sineor Laboratory Assistants—all from Central Electrochemical Research Institute, Karaikudi, Tamil Nadu, India, all Indian Nationals.

This invention relates to improvements in or relating to acidification of phosphate solutions employed in phosphating and other conversion coatings.

Hitherto it has been proposed to employ phosphoric acid for acidifying phosphate solutions employed in phosphating and other conversion coating processes. This is open to the objection that phosphoric acid is a costly material and involves import of a basic raw-material (rock phosphate) for its production while trisodium phosphate is a biproduct from an existing industry in India.

The object of the present invention is to obviate these disadvantages by employing ion-exchange methods for producing an acidified solution of sodium phosphate and regenerating the cation exchange resin available indigenously utilising Hydrochloric acid or sulphuric acid.

To these ends the invention broadly consists in passing sodium phosphate solution (in the pH range of 5-11) through a cation exchange resin bed such that the outflow is in the pH range of 0.5-2, the resin being regenerated by subsequently passing dilute hydrochloric acid or sulphuric acid and washing by water to remove adhering free acid before passing another charge of phosphate solution.

The following typical examples are given to illustrate the invention.

Example 1

Vol. of Trisodium phosphate (w/v) as 5% solution 520 litres, pH of the starting solution=10. Amount of cation exchange resin in the bed=50 kgs.

Product from Ion Exchange column :—

- (a) I Batch 180 L—pH 0.75
- (b) II Batch 270 L—pH 1.50

(c) III Batch 70 L—pH 3.00

Total Vol=520 L. bulk pH value=2.

Rate of flow=20 litres per minute.

Example 2

Regeneration

(a) Vol. of hydrochloric acid passed through the Ion exchange bed, 450=L.

Concentration of Hydrochloric acid used=5% (v/v).

Regenerated cation exchange resin produced acidified phosphate solution as per the quantities given in the Example 1.

(b) Volume of sulphuric acid passed through the Ion exchange bed: 410 L of 5% (v/v) concentration.

(a) I Batch 180 L—0.75

(b) II Batch 270 L—1.5

(c) III Batch 70 L—3.0

Total Vol.=520L average pH : 2

Rate of flow=20 litres per minute.

The following are the main advantages of the invention :—

- (1) The use of costly phosphoric acid for acidifying phosphate solution is eliminated. The cost of acidification is reduced to one third of that of phosphoric acid.
- (2) The use of readily available and comparatively cheap acids like hydrochloric acid, sulphuric acid is made possible.
- (3) The acidified phosphate solutions can be used for phosphating of metallic surfaces either by electrolytic treatment or by chemical conversion methods.

Dated this 20th February, 1973.

(Sd.)

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Price: TWO RUPEES.

cation exchange resin which in turn utilises common acids like HCl or H_2SO_4 for its own regeneration. Make up of phosphate radical is done through the use of fresh sodium phosphate whose acidity could be adjusted again to the desired value with the cation exchange resin. Thus the need for phosphoric acid for both pH correction and phosphate make-up is eliminated.

WE CLAIM :

1. A process for producing a new acidified phosphate solution suitable for phosphating of metallic surfaces or rusted steel surfaces which consists in generating acidity in an alkaline phosphate solution by passing it through an ion exchange column containing cation

exchange resin thereby avoiding the use of costly phosphoric acid for acidifying the phosphate solution.

2. A process as claimed in claim 1 wherein the cation exchange resin is regenerated by periodically passing HCl or H_2SO_4 solution through the column.

3. A process for producing a new acidified sodium phosphate solution suitable for chemical phosphating of metallic surfaces or rusted steel surfaces substantially as herein before described.

Dated this 1st day of January, 1974.

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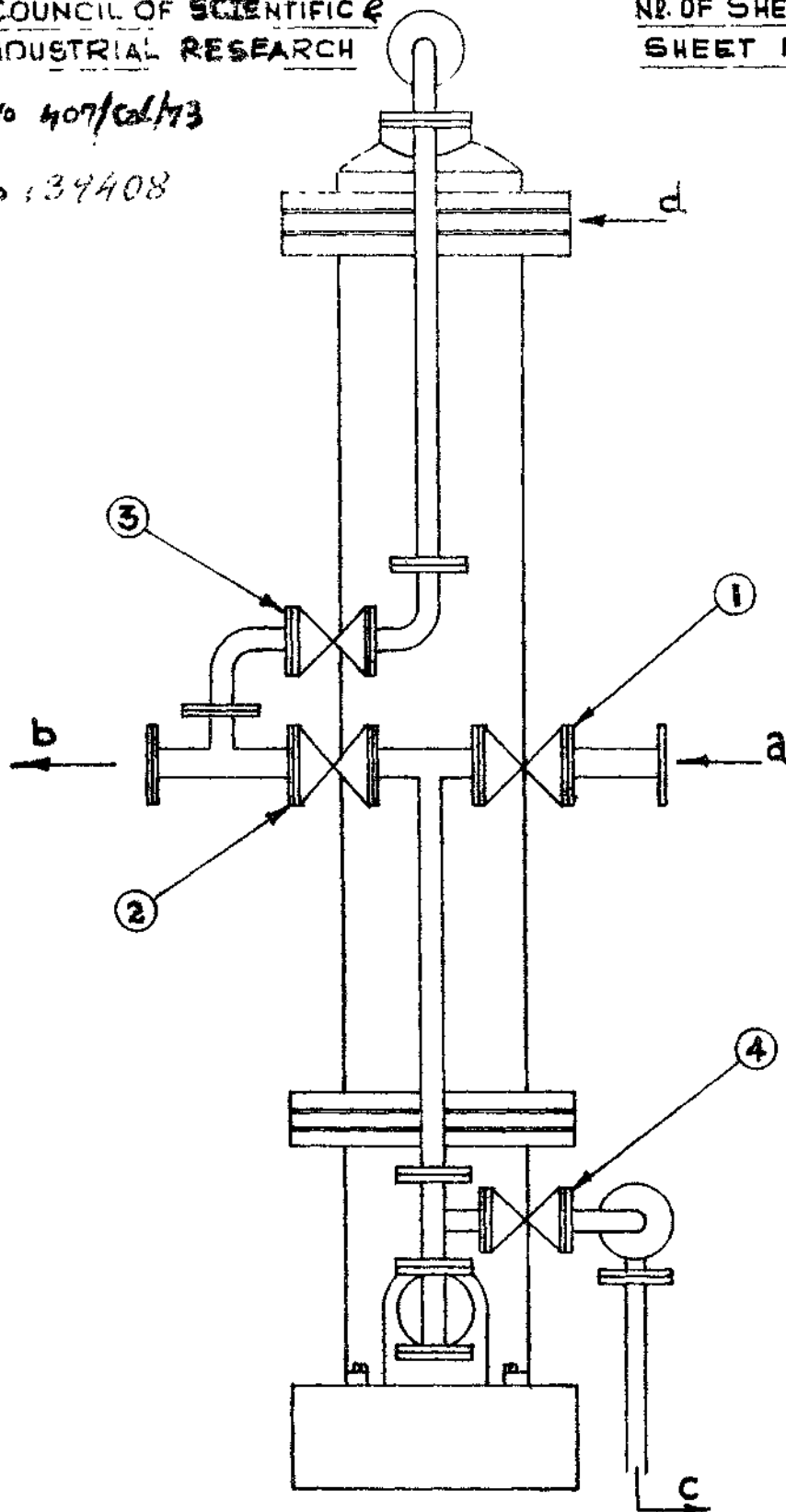


FIG-1

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