



TECHNICAL SERVICE DATA SHEET

PHOSFINE – Z 41

HEAVY CRYSTALLINE ZINC-IRON PHOSPHATE PROCESS

INTRODUCTION

PHOSFINE - Z 41 is phosphating concentrate for accelerated hot immersion process which produces complex Zinc-Iron phosphate coating on steel and zinc surfaces.

It is mainly used for protecting steel machine parts, fasteners, bolts, nuts, automobile components etc. from corrosion. These components are phosphate coated and sealed with a suitable rust preventive oil. It is also ideal for cold working applications such as wire, tube drawing, sheet metal pressing to facilitate forming and drawing. The phosphate coating obtained reduces friction during drawing and increases the life of die. As a painting pre treatment, it gives a heavy duty protection to the painted components. Type of coating: Class A2. Coating weight of 800-1600 mg/sq.ft

Phosfine - Z 41 can be operated at lower temperature, by adding Phosfine Accelerator to the bath, which results in substantial fuel savings and higher profitability; thus fights high fuel prices. The use of accelerator "A" produces fast finer grained phosphate coating

Phosphate coatings produced by Phosfine - Z 41 meets the specifications of IS 3618-1966 Class A2 and also has the following added features:

- High coverage reduces chemical costs.
- Low sludge formation leads to a longer bath life and minimum down-time.
- The shorter process cycle results in increased production.
- High corrosion resistance.
- Lower temperature operation substantially reduces the fuel cost.

BATH MAKE-UP:

Clean the tank thoroughly before making up the solution. Be sure all grease, rust and scale are removed prior to making the phosphating solution.

FOR PROCESS WITHOUT PHOSFINE ACCELERATOR;

1. Fill up the tank to half of its capacity with cold water.
2. Add Phosfine- Z 41 5 litre per 100 litres of bath solution.
3. Make up to its operating level with cold water and mix it by stirring.
4. Carry out aging by introducing 30 - 50 gms of cleaned steel wool per 100 litres to bath solution at 50 - 55°C for 10 -15 minutes. Remove the steel wool.
5. Heat the bath at its operating temperature.
6. Process the material

FOR PROCESS WITH PHOSFINE ACCELERATOR;

Prepare the solution up to stage 3 as given under the heading “process without Phosfine accelerator”. Heat the bath to its operating temperature and add Phosfine accelerator at the rate of 40 ml/per 100 litres of bath solution just before commencing the work.

OPERATING CONDITIONS:

	Without accelerator	With accelerator
Conc. of Phosfine- Z 41	3 - 5 % v/v	3 - 5% v/v
Phosfine accelerator	.....	0.03 - 0.05% v/v
Operating Temperature(°C)	80-90	55-70
Immersion Time (mins)	3-6	2-5

MAINTENANCE

For optimum results and maximum solution life the PHOSFINE – Z 41 solution and Phosfine accelerator should be maintained on the basis of regular analysis using the analytical procedure outlined under the heading of Control.

FERROUS IRON CONCENTRATION

During phosphating operation ferrous iron builds up in the solution and iron content more than 0.4% adversely affects the corrosion resistance and weight of the deposited coating and also ferrous iron should be checked and maintained below 0.4% by either discarding the solution completely or partially. Method of analyzing the Ferrous content is given under the "Control" Heading.

SLUDGE:

During operation of Phosfine -Z 41 sludge, a natural by product of the chemical reaction, is formed slowly. This sludge will settle to the bottom of the tank and should not be stirred up while parts are being processed; otherwise dusty coatings may result.

The solution should be desludged periodically preferably once or twice a month.

PHOSFINE ACCELERATOR CONCENTRATION:

It is important to have the correct amount of Phosfine Accelerator in phosphating bath. The Accelerator concentration can be checked by starch Indicator paper. At any time during the bath Operation Starch Iodide Paper should turn Blue.

Color of Test paper

No Phosfine Accelerator	White
Low .....do.....	Pale Brown
Optimum...do.....	Blue
Excess.....do.....	Black

Excess Phosfine accelerator produces more sludge and results in high consumption of PHOSFINE – Z 41. Low concentration of Phosfine Phosfine accelerator gives rise to accumulation of iron salts and adversely affects the coating.

TEMPERATURE:

To obtain good coating it is necessary to maintain PHOSFINE - Z 41 bath temperature in limit as specified under the column of operating conditions. If the temperature increases more than the upper limit white loose powdery coating is obtained. Lower temperature produce meager thin deposit of bluish rust appearances.

PROCESS CYCLE:

The components which are to be phosphated be free of oil, grease, rust scale etc. The type of process cycle depends upon the amount of oil, scale etc. present on components.

The selection of cleaning cycle is influenced mainly by the type of soil to be removed, the required degree of cleanliness and the cost. Generally the following process cycle is adopted for M.S. Components.

1. **DEGREASING:** The best method is to be clean with Trichloroethylene vapour degreasing. This process is recommended where heavy oils and grease are present on the work and good quality of cleanliness is desired. This process is most suitable for mass production. Alkaline and emulsion cleaners are also used economically either by dip or spray. ARDEE's Alkaline Degreaser RD - 1 ----- Heavy duty Alkaline soak cleaner is recommended.
2. **RINSING:** A clean cold continuously over flowing water rinse should be used.
3. **PICKLING/DERUSTING:** When rust, scale or oxides are present on acid pickle should be employed. RUSTBAN -77 or RUSTBAN - 111 is recommended.
4. **RINSING** : A clean cold continuously over-flowing water rinse should be used.
5. **PHOSPHATISING** : As describe in the above paragraphs.
6. **RINSING** : Again clean cold continuously over-flowing water rinse should be used.

7. **SEALING** : Dip in Passivex-A bath to seal the phosphate film and to leave the surface acidic to improve the corrosion resistance and paint adhesion.
8. **DRYING AND OILING** : Hot air blowing to dry free of moisture and dip in Rust Preventive oil.

TIMINGS OF PROCESS CYCLE:

- | | | |
|--------------|-------|-----------------|
| 1. Degrease | ..... | 5 - 15 mts. |
| 2. Rinse | ..... | 15 - 30 seconds |
| 3. Derust | ..... | 5 - 10 mts. |
| 4. Rinse | ..... | 15 - 30 seconds |
| 5. Phosphate | ..... | 3 - 6 mts. |
| 6. Rinse | ..... | 15 - 30 seconds |
| 7. Seal | ..... | 1 - 3 mts. |
| 8. Dry | ..... | 1 - 3 mts. |

PHOSFINE - Z 41 is an acidic and oxidizing in nature. Normal safety precautions such as rubber gloves and aprons as well as safety glasses should be worn when handling these chemicals. In case of contact with skin, flush with plenty of cold water; for eyes flush with cold water and obtain medical attention.

CONTROL:

PHOSFINE - Z 41 CONCENTRATIONS:

Pipette out 10cc of the bath solution, add 5 drops of Phenolphthalein indicator, shake well titrate against 0.1N Sodium Hydroxide till color changes to permanent pink.

The number of ccs of Sodium hydroxide corresponds to "Total Acid Pointage".

For each point below 22 add 125 - 150 ml of PHOSFINE - Z 41 per 100 litres of bath.

FERROUS IRON CONCENTRATION:

(For Process without Phosfine accelerator)

Pipette out 10cc of bath solution into a conical flask, add 1 - 2 cc of 50% sulfuric acid to it. Titrate against 0.1N Potassium permanganate till color changes from colorless to pink, persisting for atleast 15 seconds. No. of cc of 0.1N of KMnO4 required x 0.056 = % of Ferrous Iron. If ferrous iron concentration exceeds 0.4% bath should be partially or completely discarded.

PHOSFINE ACCELERATOR "A" CONCENTRATION:

(At any time, during the bath operation starch iodide paper should turn blue).

This should be checked several times a day. Before performing titration for the determination of Accelerator A concentration, carry out the starch-Iodide paper test. If the test is positive (i.e. if the paper turns blue) perform the titration directly. If the test is negative (i.e. if the paper remains white or turns pale brown) add Accelerator A solution at the rate of 100cc per 100 litres of the bath solution till the test is positive. Only after getting this proceed with the titration for concentration determination.

Pipette out 50cc of the bath solution into a conical flask, add 4-5 cc of 50% Sulfuric acid, and mix well. Titrate against 0.1N Potassium permanganate till color changes to pink, persisting for atleast 15 seconds. Freshly prepared bath will have concentration 3 points (i.e. 3 cc of 0.1N Potassium permanganate).

Preferred concentration range is 1-4 points. Add 10 cc of Phosfine Accelerator per 100 litres of the bath solution to raise the concentration by 1 point.

EQUIPMENT :

Selection of equipment such as material of construction of tanks, size of tanks type of heating and handling devices depends on the production rate, type of components, kind of finish needed and various other factors. Contact us for any guidance required.

HANDLING AND SAFETY PRECAUTIONS :

Phosfine - Z 41 is mildly acidic and oxidizing in nature. Normal safety precautions such as rubber gloves and aprons as well as safety glasses should be worn when handling this chemical. In case of contact with skin, flush with plenty of cold water, for eyes flush with cold water and obtain medical attention.
