



ABPHOS 700Z

IMMERSION ZINC PHOSPHATE PROCESS

INTRODUCTION

ABPHOS 700Z is a versatile nitrite-accelerated zinc phosphate process for use on ferrous metals. Depending upon the method of operation, ABPHOS 700Z will produce, in rapid time, uniform, fine crystalline deposits of zinc phosphate, with coating weights in the range of 3.5 - 8.5g/m². The coatings produced by this process are ideal for:

- (a) Pre-painting operations - to improve adhesion and overall corrosion resistance.
- (b) Cold forming and drawing operations - to improve lubricity i.e.wire and tube drawing.

ABPHOS 700Z coatings conform to the requirements of B.S. 3189 -1973 Type 2 and D.E.F. Stan 03-11/1 Class II. When used for cold forming and/or drawing operations, the ABPHOS 700Z process has the following advantages:

- (i) Elimination of metal-to-metal contact, thus preventing pick-up.
- (ii) A smoother, more uniform finish.
- (iii) Enables higher drawing speeds or greater deformation.
- (iv) Appreciably extends tool and die life.
- (v) Eliminates or reduces the need for inter-stage annealing.

PROCESS MATERIALS AND SPECIFICATIONS

The **ABPHOS 700Z** process is easily prepared and maintained. It comprises the following:

- (A) **TARGET ZINSTART**
A clear, colourless solution with a specific gravity of 1.45. TARGET ZINSTART is used in conjunction with ABPHOS 700Z to prepare NEW solutions. The normal make up ratio is one-part ZINSTART to two parts ABPHOS 700Z.
- (B) **ABPHOS 700Z**
A clear colourless solution with a specific gravity of 1.67. ABPHOS 700Z is used in the initial make-up of new solutions, and for normal working replenishment.
- (C) **SODIUM NITRITE**
A crystalline powder, readily soluble in water, used to control the iron content in the process, and to accelerate coating deposition.



OPERATING INSTRUCTIONS

The ABPHOS 700Z process is suitable for use in both immersion or barrel operations. Generally, the process is operated by controlling:

- (i) Temperature.
- (ii) Concentration - expressed as Total Acid Pointage (TA).
- (iii) Accelerator - expressed as Accelerator Pointage (AP).

- (i) **TEMPERATURE** - 55 - 90°C. (Optimum 75°C.)
The higher temperatures generally enable more rapid completion of the coating process.

- (ii) **CONCENTRATION**
15 to 18 points TA.
Normal operation for pre-paint applications 15 – 25 points TA.

Normal operation for wire and tube drawing 20 - 40 points TA.

For high-speed processing, e.g. strand wire processing or deep extrusion applications up to 80 points TA.

- (iii) **ACCELERATOR**

For metal working applications, the working solution should turn starch-iodide paper blue. Should the paper remain colourless when immersed, sufficient sodium nitrite solution (to produce a level of 100 - 200g sodium nitrite per 1000 litres of working solution), should be added in small increments - until a freshly dipped paper turns blue. For pre-paint applications a slightly higher level of accelerator is required. After testing with starch-iodide papers to a blue colouration, the accelerator content should be analysed for (as detailed under TESTING & CONTROL). The normal AP range is 2 - 4.

MAKE-UP AND OPERATION

To prepare a new tank with (for example) a working strength of 30 points TA, proceed as follows:

1. Partially fill the tank with water.
2. Add ABPHOS 700Z at the rate of 2% (v/v) (20 litres per 1000 litres), followed by TARGET ZINSTART at the rate of 1% (v/v) (10 litres per 1000 litres).
3. Add the remaining water, and heat to the operating temperature.



4. In a separate container, dissolve the required sodium nitrite in cold water. The concentration should be sufficient to produce a level of 200g sodium nitrite per 1000 litres in the working solution.
5. Immediately before processing any work, the sodium nitrite solution should be added to the tank.

Process treatment consists of immersing the cleaned and well-rinsed work in the solution at working temperature for 1 - 10 minutes (depending upon the specific application).

PROCESS ANALYSIS

• FREE ACID (FA)

1. Pipette a 10ml sample into a conical flask.
2. Add 3 - 4 drops of Bromo Phenol Blue indicator and titrate with 0.1N sodium hydroxide (colour change yellow - blue). Each ml of 0.1N sodium hydroxide required is considered 1 Point FA.

• TOTAL ACID (TA)

1. Pipette a 10ml sample into a conical flask.
2. Add 3 - 4 drops of phenolphthalein indicator, and titrate with 0.1N sodium hydroxide (colour change colourless - pink). Each ml of 0.1N sodium hydroxide required is considered 1 Point TA.

• ACCELERATOR

First, confirm that nitrite is present, using starch-iodide paper (deep blue colour), then proceed as follows:

1. Pipette a 50-ml sample of the working solution into a conical flask.
2. Add 2-3 ml of 50% sulphuric acid and titrate with 0.1N potassium permanganate until a pink colour, lasting for at least 15 to 20 seconds, is obtained. Each ml of 0.1N potassium permanganate required is considered 1 Point AP.

PROCESS CONTROL

• ACID RATIO

Under normal operating conditions the ratio of Free Acid to Total Acid will automatically be held between 1 : 5.5 and 1 : 8.5.



• TOTAL ACID

To replace working losses, an addition of 830mls ABPHOS 700Z per 1000 litres will increase the Total Acid by 1 Point.

• FREE ACID

The Free Acid concentration may be increased by 1 Point by adding 3.33 litres of ABPHOS 700Z per 1000 litres of solution.

• ACCELERATOR

Providing that the solution turns starch-iodide paper blue, an addition of 60 grammes of sodium nitrite per 1000 litres of solution will increase the AP by 1 Point.

EQUIPMENT

Conventional immersion processing equipment may be used. The ABPHOS 700Z tank should ideally be constructed of stainless steel (Type 316). Preferred heating is by stainless steel, steam-heated panels, or gas burners in flame tubes. Sufficient space should be left between the bottom of the heaters and the base of the tank, so that sludge settlement has a minimal effect on heat transfer.

HANDLING & SAFETY PRECAUTIONS

ABPHOS 700Z is strongly acidic. When handling, avoid contact with eyes, skin and clothing. In case of eye contact, irrigate with copious amounts of water or normal saline solution. Seek qualified medical assistance without delay. In case of skin contact, remove contaminated clothing and drench skin thoroughly with water. (Launder clothing before re-use).

For more comprehensive information consult the ABPHOS 700Z MSDS.

DISPOSAL

Dispose of in accordance with local authority requirements.

PRODUCT FAMILIES

The following products are referred to in this data sheet.



PRODUCT NAME	PRODUCT NUMBER
ABPHOS 700Z	ABPH/700Z/25

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