



# APPLICATION DATA SHEET

## BLACKFAST 970IZ IRON/ZINC PHOSPHATE

Use: 3% in water.

Application: Blackfast 970iz is a liquid iron/zinc phosphate process. The process will treat iron and steel. Blackfast 970iz produces a phosphate surface with the ability to absorb large quantities of Blackfast finishing oil, to give maximum corrosion resistance. It is also suitable for rubber bonding. The process gives a coating weight in excess of 5g/sq. m, which meets the requirement of BS3189: 1973 Type 2 and DEF STAN 03-11/3 Class 2.

| <u>Sequence of operations</u> | <u>Process description</u>  | <u>Strength (Concentration)</u> | <u>Process time (mins)</u> | <u>Temperature °C</u> |
|-------------------------------|-----------------------------|---------------------------------|----------------------------|-----------------------|
| 1                             | Blackfast Alkaline cleaning | (see data sheet)                |                            |                       |
| 2                             | Running cold water rinse    |                                 | 0.5 - 1.0                  |                       |
| <b>3</b>                      | <b>Blackfast 970iz</b>      | <b>30 - 60 points</b>           | <b>5-15</b>                | <b>60 - 90</b>        |
| 4                             | Running cold water rinse    |                                 | 0.5 - 1.0                  | Ambient               |
| 5                             | water rinse                 |                                 | 0.5 - 1.0                  | Ambient - 55          |
| 6                             | 925 dewatering oil or dry   | (see data sheet)                |                            |                       |

Operating the process *Chemicals required:*

| <u>Product Name</u>                    | <u>Description</u>                       |
|--|--|
| Blackfast 970iz                        | Phosphate chemical                       |
| Phenolphthalein indicator solution     | For pointage determination               |
| Bromo-Phenol blue indicator            | For free Acid determination              |
| 0.1N Sodium Hydroxide testing solution | For pointage and Free Acid determination |
| 0.1N Potassium Permanganate solution   | For Iron determination                   |
| Phosphoric/Sulphuric testing solution  | For Iron determination                   |
| Iron wool or clean scrap               | To condition the bath                    |

### *Make-up*

To make up the solution carry out the following instructions:  
Clean the tanks and purge if necessary and flush out with clean water.  
Determine the working volume of the tank or refer to the relevant Plant Information and Control summary sheet.  
Fill the tank 75% full with clean water and heat to the operating temperature.  
For each 1000 litres of working solution add:

|                          |           |
|--------------------------|-----------|
| Blackfast 970iz          | 30 litres |
| Iron wool or clean scrap | 1 Kg      |

Make-up to the normal operating level with clean water. Mix thoroughly and heat to the operating temperature. Test and make any final adjustments.

Testing and control *Total Acid Concentration (pointage):*

Take a 10ml representative sample of the bath solution and transfer it to a clean 250ml beaker. Add 5 to 10 drops of Phenolphthalein indicator and titrate with 0.1N Sodium Hydroxide testing solution until the colour changes from colourless to a permanent pink. The reading on the burette represents the strength (pointage) of the bath. A solution made up as 3% will have a pointage of 30. For every point below the recommended figure add 1.5 litres of Blackfast 970iz per 1000 litres of bath solution.

MARCH 2003

#### *Free Acid Pointage:*

Take a 10ml representative sample of the bath and transfer it to a clean 250ml beaker. Add 5 to 10 drops of Bromo-Phenol Blue indicator and titrate with 0.1N Sodium Hydroxide until a colour change from yellow to green/blue is obtained.

The reading on the burette represents the Free Acid pointage of the bath and on a fresh bath should be 5.

The ratio of Total Acid to Free Acid should be kept in the range 6 to 6.5 for optimum results. The Free Acid pointage can be raised or lowered by 1 point/1000 litres by addition of either of the following:

|                     |                                  |
|---------------------|----------------------------------|
| 75% Phosphoric Acid | 0.82 litres (to raise Free Acid) |
| Sodium Carbonate    | 1.3 Kg (to lower Free Acid)      |

#### *Ferrous Iron content*

Take a 10ml representative sample of the bath solution and transfer to a clean 250ml beaker. Add 10 to 20 drops of Phosphoric/Sulphuric Acid testing solution and titrate with 0.1N Potassium Permanganate testing solution until a persistent pink colour is obtained.

The reading on the burette x 0.056 = gms/litre Ferrous Iron in the bath.

When Ferrous iron reaches 60-80 gms/litre it should be discarded.

|                          |   |
|--------------------------|---|
| Iron Wool or clean scrap | 1Kg (to raise the Ferrous Iron content) |
|--------------------------|---|

The working bath should be tested regularly. Small, frequent additions are recommended for consistent results rather than just one occasional large addition. If chemical metering pumps are installed, adjust the output to maintain the optimum concentration.

#### Bath maintenance

Once established the operating parameters of the process should be maintained to within +/- 5% of the optimum values. Thermostat controls and temperature indicators should be checked regularly to ensure correct operation. The process can normally be used for long periods before the process loses its effectiveness (up to 6 months).

Sludge is produced as a by-product of the process reaction and will require removal before its accumulation interferes with heating or the processing of components. This can be accomplished by pumping-over the clear working solution into a nearby clean empty rinse tank and then removing the sludge from the bottom of the process tank by any convenient means. The sludge will require disposal via a licensed waste contractor.

Heating coils or plates should be descaled if the build-up is likely to interfere with heating efficiency. This can be done by mechanical means or by acid cleaning. Cleaning of electric heating elements is particularly important to avoid burnout. The process solution is then pumped back, made up to normal operating level with clean water, mixed thoroughly and tested.

#### Tank material

Tanks may be fabricated from 6mm thick rubber lined, mild steel, double welded inside and out, although for maximum service life and for heating equipment, grade 316 S16 stainless steel is to be preferred. Non ferrous metals must not be used for equipment that will come into contact with the solution. There should be adequate clearance between heater and the bottom of the tank to allow sludge to collect undisturbed.

Automatic water top up or a solution level alarm is recommended to avoid excessive concentration fluctuations due to loss of water through evaporation.

#### Product safety data sheet:

A safety data sheet is available.

Blackfast 970IZ iron/zinc phosphate is part of the Blackfast range of products for the chemical blacking of iron and steel at room temperature.

Blackfast Chemicals continues to improve the quality and performance of its range of products and reserves the right to modify product formulations without prior notice.

MARCH 2003