

TRADE MARKS REGISTRY



REGISTRATION CERTIFICATE

Trade Mark Act 1994 of

Great Britain and Northern Ireland

I certify that the mark shown below has been registered under No. UK00003161197 effective as of the date 25/04/2016 and has been entered in the register on 26/08/2016

Signed this day at my direction

John Alty

JOHN ALTY
REGISTRAR

Representation of Mark
PHOS-PREP

The mark has been registered in respect of:

Class 1:

Chemical substances, chemical materials and chemical preparations and natural elements; Chemicals for use in agricultural, chemical preparations.

In the name of Pre Treatment Solutions Ltd
Company number 06768560

AUTO-WASH POWDER COATING PRE-TREATMENT MACHINE WITH PHOS PREP PROCESS SOLUTIONS



Powder coating pre treatment

The Auto-wash is our fully automated, pre-treatment machine for use in the powder coating industry. Successful powder coating involves more than spraying powder and curing in an oven. The pre-treatment process can determine the difference between an average job and a first class one. Quality standards are inexorably rising in all aspects of industry and no more so than in powder paint finishing. More and more customers are demanding a phosphate conversion coating. The days of wiping products down by hand are becoming limited and it is no coincidence that the most successful powder coaters have decent pre-treatment systems.

Our standard Auto-Wash is a two tank system and is suitable for most steel and aluminium processes. It is very simple to operate, economical to run and completes its cycle quickly. After loading the parts, which can be done using a trolley system, the machine heats the chamber to 40°C to soften any oil or dirt residue, and then washes the parts with a detergent and phosphate solution. This is followed by a cold water rinse and finally drying at 100°C.

A four stage system, used specifically for certain types of aluminium pre-treatment, can also be produced.

The chamber, tanks and various other parts are made from stainless steel.

The whole process is automatically controlled via an on board Siemens PLC computer.



Loading the Auto-Wash

Features of our Auto-wash:

- Fully automated sequence
- Choice of front or side loading
- Very low running costs
- Typical cycle time of 20 minutes
- Dry-off facility
- Multi-metal solutions now available to treat both steel and aluminium
- Proven design - our machines are currently in use worldwide
- Our UK manufacturing plant produces high quality machines, designed and built to last.
- CE mark
- Fully guaranteed
- Service contracts available
- Training and help with chemical selection - our recommended supplier of chemicals for use with our Auto Wash - www.pretreatmentsolutionsltd.com

Water recycle unit can be installed to allow for deionisation of water essential for use in hard water area's to maintain powder adhesion quality



PHOS-PREP® phosphate pre treatment

Our standard Auto-Wash machines all have a chamber size of 1.25 m wide and 1.5 m high. The prices below are for our standard 2 stage unit sizes in different lengths: For the 2 / 4 stage unit P.O.A



DESCRIPTION OF - PHOSPHATING

Phosphate preparation is a chemical process that converts the surface layer of the substrate to a strong, adherent phosphate the coating creates a rust resistant layer with an excellent surface for subsequent paint & powder coatings.

Were the powder and phosphate coating to become damaged exposing the base substrate the phosphate process will prevent rapid oxidation preventing creep oxidation & minimises the powder coat finish from delaminating.

TYPES OF PHOSPHATE PROCESSES

Phosphate process consist primarily of iron, zinc & manganese phosphates, a new addition to the pre-treatment industry is 971 T new clean easy & safe to use, combined degreaser & conversion coating process that exceeds the performance of traditional iron & zinc phosphates process, and is suitable for ferrous & non-ferrous substrates.

STANDARDS FOR SPECIFIC PHOSPHATE PROCESSES

Def Stan 03-11 Phosphate treatment is defined by reference to a particular

Class: BS3189 DEF 03-11.

Class 1 : Manganese phosphate > 7.5 g/m² coating weight

Class 11 : Zinc phosphate > 4.5 g/m² coating weight

Class III : Zinc phosphate - 1.5 to 4.5 g/m² coating weight

Class IV : Iron phosphate - 0.2 to 1.5 g/m² coating weight

*Correct at time of publication

PHOS-PREP® Pre Treatment solutions used for the preparation of metal parts prior to powder coating are completely free of chrome based additives and comply with the latest environmental legislation.

PHOS PREP® is a registered brand

PHOS PREP® will replace existing Chrome based systems

PHOS PREP® will save the regeneration of deionised water by up to 50% as no final water required

PHOS PREP® will save on process solution cost by up to 35%

PHOS PREP® will offer full technical chemical laboratory back up

PHOS PREP® will offer full in house accelerated corrosion testing

PHOS PREP® will offer full technical support on site to introduce the process to new clients

PHOS PREP® is THE BEST CHROME FREE ALTERNATIVE IN THE PRE TREATMENT SECTOR TODAY

PHOS-PREP® PP 971T

Pre-Treatment Solutions low temperature Zirconium Titanium multi metal process produce's better quality with improved throughput at lower costs

The main benefits are:

- **Reduced consumption levels** - 1/4 to 1/2 of traditional phosphates.
- **Improved corrosion protection.**
- **Ingredients are safe for users and environment.**
- **Increased work throughput.**
- **Low sludging and long bath life > 1 years.**
- **Elimination of a cleaning station on the line.**
- **Reduced energy requirement** - Lower process tank temperatures.
- **Reduced VOC, BOD and COD emissions.**

Easy to replace existing phosphate lines

The PTS PHOS-PREP® PP 971T product produce's a conversion coating that can replace existing iron or zinc spray, soak phosphate lines on steel, aluminium, zinc substrate or allochrom. The application is a pretreatment for any painted surface in use in the automotive industry through industrial to household goods.

SINGLE STAGE CLEANING AND PHOSPHATE

The unique materials which make up the proprietary formulation act as a powerful cleaning agent, thus eliminating the cleaning station

ENHANCED PERFORMANCE

Improved accelerators and grain refiners react with the steel, aluminium or zinc surface and produces a strongly adhering amorphous coating giving enhanced salt spray

INCREASED THROUGHPUT

The process takes between 45 seconds and 3 minutes depending upon temperature and coating weight required. The cleaning stage is eliminated

REDUCED EFFLUENT AND WASTE

80% higher process efficiency mean low sludging, long bath life upto 1 years. Safe & easy to ingredients means reduced BOD and COD

REDUCED ENERGY REQUIREMENT

The coating is applied by spray or soak at operating temperature between 30°C and 60°C. Low incident of flash rusting allows drying ovens to be set at lower temperatures

SAFE

The PP 971T ingredients are safe for users and environment.

Reducing effluent
COSTS

PERFORMANCE ON MILD STEEL WITH A POWDER PAINT FINISH

RESULTS IN ACCORDANCE WITH ASTM B117 -NEUTRAL SALT SPRAY TEST METHOD



PP 971 T multi metal <0.7g/m² - > 800+ Hours
Iron phosphate Class 1V - 0.2 to 1.5g/m² - > 400 to 850 Hours
dependant on coating weight
Zinc phosphate Class 111 - 1.5 to 4.5g/m² - > 600 to 1000 Hours
dependant on coating weight
Zinc phosphate Class 11 - >4.5g/m² - > 1000 Hours

PERFORMANCE ON ALUMINIUM & GALVANISED WITH A POWDER PAINT FINISH

RESULTS IN ACCORDANCE WITH ASTM B117 - ACETIC ACID SALT SPRAY TEST METHOD

PP 971 T multi metal >500 Hours

Iron phosphate < 300

Hours

PP 920 Dry in place >1000

Hours

PP 910 Chrome free >1000

Hours

Chromate process >1000 Hours



PHOS-PREP® PP 971 T

Multi Metal Nano Technology Conversion Pre –Treatment for Aluminium, Mild Steel & Zinc Substrates.

Benefits:

- Degrease & Phosphate
- Low operating temperature
- Reduced sludge
- Increased work throughput
- Improved Corrosion protection
- Safe & Easy to Maintain
- Reduced Consumption Levels
- Reduced VOC,BOD & COD Emissions
- No scale Build Up In Spray Pipe Work



PHOS-PREP® PP 983LC - LASER OXIDE REMOVAL PROCESS



When steel is cut by the laser method, a carbon deposit is left upon the edge of the surface.

If not removed, when powder coated it will result in paint adhesion failure on the edge of the component. Pre-Treatment Solutions Ltd have developed a pre-treatment process that will remove all loose scale and leave the edge phosphated to maximise paint adhesion

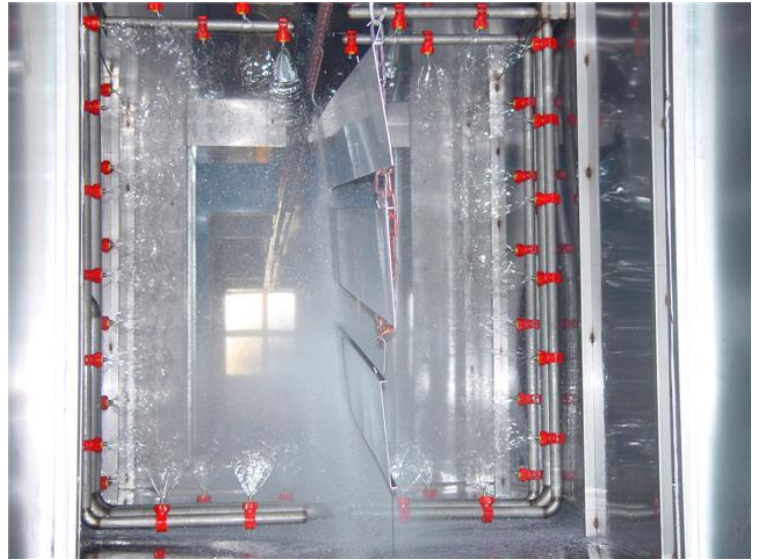
- Poor edge adhesion for powder coating eliminated
- No more labour intensive 'fettling' of edges to achieve good powder adhesion, resulting in considerable
- 'Drop in' replacement for conventional iron phosphate processes*
- Combined degrease and phosphate properties still retained
- Low operating temperature 35 to 50 °C
- Extended bath life
- Multi-metal; will process mild steel and galvanised steel in any order and quantity
- Excellent coating weight resulting in good performance
- *Stainless steel process equipment required

PHOS-PREP® PP 920 DRY IN PLACE For Architectural Aluminium

Chrome Free Pre-Treatment for Aluminium & Zinc Based Substrates.

Benefits:

- Chrome Free
- No Rinse System
- Single Solution Top – Up
- Dry in place
- No Chrome in Rinse Water
- Easy to control
- Spray & Immersion



PHOS-PREP® PP 992 / PP 995

Traditional iron phosphates that can be used in hot spray box washers or used in on line two / three stage pre-treatments lines

Cleans & phosphate in one operation

Easy operation

Single titration control

Add PHOS-PREP® PP 975 for added cleaning capability

Operating temperatures 45° C to 60° C

When used in box washers PHOS-PREP® PP 973 Chrome free rinse seal (added to water rinse) is advised to prevent rapid oxidation as this can occur with cast Iron / mild steel parts in the humid box washer environment

Class 1V performance

PHOS-PREP® PP 992 / PP 995 offers <500 hrs salt spray performance (ASTM B117 NSS)



Example of cast iron processed in a Vixen box washer with

PHOS-PREP® PP 992 / PP 995 & PHOS-PREP® PP 973

Methods of quality test for painted surfaces

Solvents Rub test ISO 2812-1 method 2 EN 13523-11 Resistance to solvents is checked by rubbing the coil coated surface with a tissue impregnated with a solvent – usually a specified solvent one is used (MIBK). Evaluation is based on colour change, blistering, gloss retention etc. Values are set in accordance with technical requirements. We supply MIBK solution for testing all powder paints. Use moderate force we prefer to suggest cotton buds held in between thumb and fore finger pressure (Mark an 8” x 1” area on the coated surface to test) soak the cotton bud it to a dripping wet condition with specified solvent - Rub forward and back motion is one double rub.

Typically, the coating manufacturer will specify the number of double rubs to be performed (often 20 to 50). The test should result in no paint being present on the cotton bud / no dulling of the rubbed area of the sample plate.

Impact resistance

ISO 6272 – 1-2011 / EN 13523-5 Impact resistance is determined by the paint’s resistance to cracking and/or peel-off after rapid deformation of the organic coated product.

A 20 mm diameter spherical indenter weight impacts the coated sample on the back side. The drop height can be adjusted between 1 cm and 150 cm so as to obtain a given impact energy. The adherence of the coating on the top side is checked using adhesive tape.

NOTE:

The apparatus used is that it should produce rapid deformation rather than a true impact.

The method described can be applied either as a pass/fail test, the test being carried out from one drop height and with a specified mass, so as to test compliance with a particular specification; or as a

classification test, to determine, by gradually increasing the drop height and/or the mass, the minimum mass and/or drop height for which the coating cracks or peels from its substrate. This test can be adopted when you are satisfied you have fully cured parts and used to determine in house quality

D522-93a (2001) Standard Test Method for Mandrel Bend Test of Organic Coatings

This test method cover the determination of the resistance to cracking / flexibility of the painted surface.

Test method A: - After curing the coated panels are bent over a conical mandrel

Test method B: - After curing the coated panels are bent over a cylindrical mandrel

The mandrel diameter can be one of choice but vary from 5mm to 40mm

The coating flexibility value is represented by the mandrel diameter at which no cracks are seen in the coating (the smaller diameter the mandrel the more stress is applied to the coating) we prefer to use a tapered mandrel from 5mm to 30mm.

Cross Hatch Testing of Powder Coated Surfaces

The cross-cut test is a method for determining the resistance of paints and coatings to separation from substrates by utilizing a tool to cut a right angle lattice pattern into the coating, penetrating all the way to the substrate.

A quick pass/fail test can be accomplished through this method.

When testing a multi-coat system, determination of the resistance to separation of different layers from one another can be accomplished.

There are two methods described in the ASTM

Test Method A

An X-cut is made through the film with a carbide tip tool to the substrate. Pressure-sensitive tape is applied over the cut. Tape is smoothed into place by using a pencil eraser over the area of the incisions. Tape is removed by pulling it off rapidly back over itself as close to an angle of 180°. Adhesion is assessed on a 0 to 5 scale. (0- Greater than 65% area removed & 5 is 0% area removed)

Test Method B

A crosshatch pattern is made through the film to the substrate. Detached flakes of coating are removed by brushing with a soft brush. Pressure-sensitive tape is applied over the crosshatch cut. Tape is smoothed into place by using a pencil eraser over the area of the incisions. Tape is removed by pulling it off rapidly back over itself as close to an angle of 180°. Adhesion is assessed on a 0 to 5 scale. (Method B is not considered to be suitable for coatings thicker than 5 mm)

Coating thickness test EN 13523-1 To determine coating thickness, an electrical probe is placed on the coating and develops an electromagnetic field in the base metal. The potential variation of this field is measured to estimate the film thickness

Colour conformity ISO 7724 EN 13523-3 The colour conformity of a coil coated material is checked using a colorimetric device, which measures the colour deviation of a sample compared with a colour standard sample

Salt spray test ISO 7253 EN ISO 4628-2 EN ISO 9227 EN 13523-8 Corrosion resistance is evaluated by exposing a test specimen to a salt fog at 35°C for a given time. Evaluation criteria after the

exposure time: blistering (in accordance with EN ISO 4628-2) should not exceed 2(S2) and delamination should not exceed 2 mm (either side) at the vertical scribed mark for coil coated products used in outdoor building applications, and 5 mm for products used in indoor building applications or appliances

UV weathering test ISO 4892-3 EN 13523-10 ASTM D4587 UV weathering is evaluated by exposing an organic coated sample to accelerated weathering (UV, humidity and temperature) for 2,000 hours. Each cycle consists of 4 hours of dry UVA exposure at 60°C, followed by 4 hours of condensation exposure at 40°C without UV radiation. Evaluation is based on colour change and gloss retention

THE AUTOWASH PRE-TREATMENT PROCESS

AUTOWASH SETTINGS

Adjusting time and heat parameters

To control Set Point 3

Press SET key on the temperature controller – wait until Green light flashes indicating

“out 1” now move the cursor keys up or down to set the temperature to the required setting. A temperature of 40°C has been found to be the most effective for softening oil and contaminants before washing, higher than this can lead to oil glazing over and is more difficult to remove.

To control Set Point 2 “Dry Off”

Repeat procedure as in set point 1 but press the SET key twice so that the green light flashes

Indicating “out 2” before setting the cursor to desired set point. **DO NOT EXCEED 100°C** as this may affect the rubber seals etc.

Adjusting time Parameters

These are controlled by the Siemens PLC. To enter parameters press ESC, move the cursor down to “Set Param” and press OK, the various timing parameters can be scroll up and down. Each parameter is displayed as a block number in the top left corner of the screen e.g. (B27), when desired number is displayed press OK and the first digit will begin to flash, move up or down to adjust the number and left and right to move across. Please note that the very right hand symbol indicates **S** for seconds and **M** for minutes and **H** for hours. Once the desired time is input press OK.

The time parameter will vary the sequence of the particular machine, see separate document.

To access Logo screen and view inputs and outputs, press **esc** twice and the time and date is now shown, move cursor to the right to view inputs

Input

1 – Start Button

3 – Sump Empty plus light on panel

6 – Set point 1 – Pre Heat 40 C

When any input is made the number will shade for example when the sump is empty input 3 should shade

2 STAGE		Est Time	4 STAGE		Est Time
B03	OVER-RUN PRE-WASH		B03	OVER-RUN PRE-WASH	
B11	EMPTY TANK A		B11	EMPTY TANK A	
B14	WASH A	02.00 m	B14	WASH A	03.00 m
B17	OVER-RUN A		B17	OVERRUN RETURN A	
B22	EMPTY TANK B		B22	EMPTY TANK B1	
B28	OVER-RUN RINSE		B25	RINSE B1	02.00 m
B25	FULL RINSE	01.00 m	B28	OVERRUN RINSE B1	
B33	DRY OFF	10.00 m	B33	EMPTY TANK B2	
B36	PULSE SPRAY TIME		B36	RINSE B2	01.00 m
B42	DELAY IN PULSE		B39	OVER-RUN RINSE B2	
			B44	EMPTY TANK C	
			B47	WASH C	02.00 m
			B50	OVERRUN RETURN C	
			B55	DRY-OFF	10.00 m
ALL OTHER PARAMETERS ARE FACTORY SET ONLY ADJUST ABOVE					00.10 m

Emptying tank - 1minute 10 seconds

Over runs - 15 seconds Guide Lines only

Dry off - 10 minutes

Etching

Rinses To individual requirements / User define

Washes

The above chart is for standard Autowash units supplied please contact Bowker Machinery Ltd to ensure you have correct settings

Autowash Maintenance Chart

Maintenance

- 1** Rinse the machine chamber out at the end of each shift. It is harmful to the machine to leave acidic solution in the chamber and pipework.

To rinse the chamber simply:

- Empty rinse water
- Spray for 1 minute
- Pump to waste

Use the manual switches to operate these functions.

- 2** Lightly oil the spinner arm bearings with a non-silicone based oil such as WD40
- 3** Clean the sump filter on a daily basis
- 4** Clean the sump float on a daily basis
- 5** Clean out tank A on a weekly basis
 - Empty contents into the sump
 - Clean out the tank
 - Check and clean the float switches
 - Pump solution back into tank A
- 6** Check and clean the float switch in the water tank on a weekly basis. When the float is down the power to the immersion heater is switched off and when the float is up the power to the immersion heater is switched on.
(A clicking noise can be heard as the contactor for the immersion heater is switched on and off).
All float switches must be clean and free.

PHOS PREP® SOLUTIONS FOR TWO STAGE & FOUR STAGE
AUTOWASH PRE TREATMENT SYSTEM

Two Stage –

OPTION A – MUTI METAL –

Use **PHOS-PREP®** PP 971T & PP 975 in TANK A

Use **PHOS-PREP®** PP 973 in TANK B

OPTION B – Mainly Cr4 with low volumes of Non Ferrous

Use **PHOS-PREP®** PP 995 & PP 975 in TANK A

Use **PHOS-PREP®** PP 996 in TANK A when processing Non Ferrous

Four Stage –

OPTION A – MUTI METAL – ALUMINIUM – ZINC BASED

Use **PHOS-PREP®** PP 931 in TANK A

Use **PHOS-PREP®** PP 920 in TANK B

OPTION B – Process for etching aluminium up to 2 g/m²

The above 4 stage will allow parts to be pre treated and meet the salt performance of Qualicoat specification however to meet the Qualicoat approval it is a requirement to etch up to 2 gm / m² from treated aluminium to do this a multi stage Autowash will be required and can be discussed on application

PHOS-PREP® PP 971T ZIRCONIUM/TITANIUM PHOSPHATE PHOS-PREP® 975/976 DETERGENT ADDITIVE

FOR ALUMINIUM, STEEL, GALVANISED STEEL AND CAST IRON

Use:

Multi metal Dilution: 0.5% PP 971T & 0.5% PP 975 for spray
Multi metal Dilution: 1% PP 971T & 1% PP 976 for immersion
Time: 2-4 minutes Temperature: 30 - 60°C

Aluminium Dilution: 1% PP 971T & 1% PP 975 for spray
Aluminium Dilution: 2% PP 971T & 1% PP 976 for immersion
Time: 2-4 minutes Temperature: 30 - 60°C

Application:

PHOS-PREP® PP 971T is a low temperature >30°C to 45°C, complete chrome free conversion coating for use on aluminium extrusions, aluminium and white metal engineered parts, aluminium coil, steel and zintec to greatly enhance corrosion protection and adhesion of subsequently applied coatings. This ensures the absolute minimum removal of aluminium from the metal surface during the conversion coating, which gives low levels of sludge and long bath life. **PHOS-PREP® PP 971 T** is a fully built product which cleans and conversion coats in a single stage, greatly reducing process times and cost. Product concentrations are easily controlled by simple titration or by conductivity or pH. The resulting conversion coats are resistant to high temperature accelerated adhesion test – heating in water to 125°C for 2 hours giving no loss of topcoat adhesion.**

** Pressure cooker test EN12206-1 part 5,10 to pass this test using **PHOS-PREP® PP PP971T** aluminium extrusions may require pre etching with PP 933 (alkaline etch) or PP932 (acidic etch) cleaning to remove oxides from the surface that may be present from the aluminium extrusion process that will interfere with top coat adhesion

PHOS-PREP® PP 971T is suitable for soak or spray application

PHOS-PREP® PP 975 & PHOS-PREP PP 976 detergent additives are a sophisticated blend of surfactants specifically formulated for use with spray & immersion pre-treatment processes to improve the degreasing capability.

PHOS-PREP® PP 975 & PP 976 may be used with lightweight iron and zinc phosphates as well as alkaline and acidic cleaners.

Equipment:

The recommended material of construction for tanks and pipe-work is 316 stainless steel, although some plastics or rubber may be suitable, provided there is no mechanical damage.

Handling & Safety:

Normal precautions for handling chemicals should be observed, **PHOS-PREP®** PP 971T causes burns to eyes and skin. In case of contact with skin wash thoroughly with plenty of water. In case of contact with eyes irrigate with copious amounts of clean water and seek medical attention immediately.

Small spills may be washed to waste with plenty of water. Larger spills should be contained and neutralised with soda ash or builders lime to a pH between 6 and 9, before washing to waste or sweeping up for disposal. Used solutions will normally contain complexed aluminium and will require neutralising before disposal.

Process Control:

Take a 75ml sample and transfer to a plastic beaker
Add 5 drops of phenolphthalein solution will go cloudy
Titrate with 0.1 N sodium hydroxide until sample turns pink

For each 1ml of 0.1 N sodium hydroxide used that indicates the actual % of the bath solution

Example:

4 mls of sodium hydroxide used = 0.4%

5 mls of sodium hydroxide used = 0.5%

10 mls of sodium hydroxide used = 1.0%

15 mls of sodium hydroxide used = 1.5%

Product Safety Data Sheet:

A safety data sheet is available

PHOS-PREP® PP 971T is part of Pre-Treatments Ltd range of products for the treatments of iron, steel & aluminium and aluminium alloys at low temperatures.

TECHNICAL DATA SHEET

PHOS-PREP® PP 995 INHIBITED SINGLE STAGE IRON PHOSPHATE

Use:

Spray: 1% solution in water
Immersion: 2% solution in water

Application:

PHOS-PREP® PP 995 is a liquid, low temperature, lightweight iron phosphate process designed to simultaneously degrease and phosphate in one operation. The process will treat iron, steel, zinc and aluminium in mixed metal production, however, when aluminium forms a significant part of the products, addition of **PHOS-PREP®** PP 996 Aluminium accelerator is required at 0.1% to aid removal of the oxide on the surface to ensure satisfactory preparation and maintain adhesion.

Make-up:

The holding tank should be thoroughly cleaned and the working volume determined. Fill the tank $\frac{3}{4}$ full with clean water and heat to operating temperature of 40°C – 50°C. For each 1000 litres of working bath add:

10 litres of **PHOS-PREP®** PP 995 for spray application
20 litres of **PHOS-PREP®** PP 995 for immersion

Make up to the normal operating level with clean water. Mix thoroughly and heat to operating temperature.

Testing and Control:

A **PHOS-PREP®** PP 995 working bath made up as recommended will have a pointage of 5.

Take 10ml of the working bath and add a few drops of phenolphthalein indicator. Titrate against a 0.1N Sodium Hydroxide solution to a pink end point. Then:

Bath pointage = number of ml of 0.1N Sodium Hydroxide added

To replenish the bath, add 2 litres of **PHOS-PREP®** PP995 concentrate per 1000 litres of bath volume for every point below the required bath pointage.

The working bath should be tested regularly. Small, frequent additions are recommended for consistent results rather than just one occasional large additions

Product safety data sheet:

A safety data sheet is available

PHOS-PREP® PP 995 is part of the **PHOS-PREP®** range of products for the treatment of iron, steel and aluminium at low temperatures.

TECHNICAL DATA SHEET

PHOS-PREP® PP 996 Aluminium Accelerator

Application:

PHOS-PREP® PP 996 Aluminium accelerator is added to process solutions where by additional etching of the aluminium or zinc based surface is required to aid the removal of natural oxides that may be present on the substrate surface

Instructions for use:

PHOS-PREP® PP 996 Aluminium accelerator is required at 0.1% to aid removal of the oxide on the surface to ensure satisfactory preparation and maintain adhesion as and when required

Control:

Manual control by adding to **PHOS-PREP®** PP 971 T / PP 992 / PP 995 at 0.1% to aid removal of the oxide on the surface of aluminium to ensure satisfactory preparation and maintain adhesion

Product safety data sheet:

A safety data sheet is available

PHOS-PREP® PP 996 is part of the **PHOS-PREP®** range of products for the treatment of iron, steel and aluminium at low temperatures.

TECHNICAL DATA SHEET

PHOS-PREP® PP 975 SPRAY DETERGENT ADDITIVE

Use:

To make up the solution carry out the following instructions:
Clean the tanks and purge if necessary and flush out with clean water.
Fill the tank 75% full with clean water and heat to the operating temperature.
Add the main process chemicals, then for each 1000 litres of working solution add:

Addition per 1000ltrs of working solution

PHOS-PREP® PP 975 (general soils)	3.0 litres
PHOS-PREP® PP 975 (heavy soils)	4.6 litres
PHOS-PREP® PP 975 (very heavy soils)	7.5 litres

Make up to the normal operating level with clean water. Mix thoroughly and heat to the operating temperature. Please note this product will foam at temperatures below 30°C.

There is no method for testing the additive concentration and it should be added pro-rata with the main process chemical, to maintain effective cleaning.

Application:

PHOS-PREP® PP 975 spray detergent additive is a sophisticated blend of surfactants specifically formulated for use with spray pre-treatment processes to improve the degreasing capability. It may be used with lightweight iron and zinc phosphates as well as alkaline and acid cleaners.

Equipment:

Tanks and heating equipment may be fabricated from 6mm thick mild steel, double welded inside and out, although for maximum service life, grade 316 S16 stainless steel is to be preferred. The spray nozzles should be constructed from either stainless steel or plastic.

Non-ferrous metals must not be used for equipment that will come into contact with the solution. Extraction is required for heated solutions. There should be adequate clearance between heaters 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

PHOS-PREP® PP 975 is part of the **PHOS-PREP®** range of products for the treatment of iron, steel and aluminium at low temperatures.

TECHNICAL DATA SHEET

PHOS-PREP® PP 976 IMMERSION DETERGENT ADDITIVE

Use:

To make up the solution carry out the following instructions:
Clean the tanks and purge if necessary and flush out with clean water.
Fill the tank 75% full with clean water and heat to the operating temperature.
Add the main process chemicals, then for each 1000 litres of working solution add:

Addition per 1000ltrs of working solution

PHOS-PREP® PP 976 (general soils)	3.0 litres
PHOS-PREP® PP 976 (heavy soils)	4.6 litres
PHOS-PREP® PP 976 (very heavy soils)	7.5 litres

Make up to the normal operating level with clean water. Mix thoroughly and heat to the operating temperature. Please note this product will foam at temperatures below 30°C.

There is no method for testing the additive concentration and it should be added pro-rata with the main process chemical, to maintain effective cleaning.

Application:

PHOS-PREP® PP 976 Immersion detergent additive is a sophisticated blend of surfactants specifically formulated for use with Immersion pre-treatment processes to improve the degreasing capability. It may be used with lightweight iron and zinc phosphates as well as alkaline and acid cleaners.

Equipment:

Tanks and heating equipment may be fabricated from 6mm thick mild steel, double welded inside and out, although for maximum service life, 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. Extraction is required for heated solutions. There should be adequate clearance between heaters 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

PHOS-PREP® PP 976 is part of the **PHOS-PREP®** range of products for the treatment of iron, steel and aluminium at low temperatures.

TECHNICAL DATA SHEET

PHOS-PREP® PP 973 CHROME FREE SEALANT

Use:

Dilution: 0.3% to 0.5% by volume
Temperature: Ambient
Time: Approximately 1 to 3 minutes

Application:

PHOS-PREP® PP 973 is an additive for the final rinse of a spray or immersion iron phosphate line to inhibit the parts that have been phosphated against corrosion prior to painting. The use of **PHOS-PREP® PP 973** is required where there is a possibility of a delay to the painting of parts that have been phosphated. The product is suitable for use on steel, aluminium and zinc surfaces, and imparts flash corrosion resistance to all these substrates. **PHOS-PREP® PP 973** also increases considerably the long term corrosion resistance of parts that have been iron phosphated and extends the humidity and salt spray results. **PHOS-PREP® PP 973** is economic in use and easily controlled.

Testing and control:

Control of the strength of **PHOS-PREP® PP 973** working bath is achieved by a simple acid/alkali titration using Bromo-Phenol Blue as an indicator. The test solution is N/10 (0.1 M) Hydrochloric test solution.

The test is carried out by taking a 45ml sample of **PHOS-PREP® PP 973** working solution and adding a few drops of Bromo-Phenol Blue, the solution turns purple.

The test solution is added until the solution turns a permanent yellow end point. An addition of 3ml indicates that the working solution is at a strength of 0.3%.

Handling and Personnel Safety:

There are no special storage requirements for this product. When handling the product, protective PVC gloves, apron and goggles to BS 2092C should be worn.

In the event of a spillage or contact with skin or clothing, drench with plenty of water. In case of eye contact, irrigate with copious amounts of clean water and seek medical attention immediately.

Product safety data sheet:

A safety data sheet is available

PHOS-PREP® PP 973 is part of the **PHOS-PREP®** range of products for the treatment of iron, steel and aluminium at low temperatures.

TECHNICAL DATA SHEET

PHOS-PREP® PP 931 LOW FOAMING HEAVY DUTY CLEANER

Use:

PHOS-PREP® PP 931 Low foaming cleaner is formulated for the spray or immersion cleaning of steel or hot dip galvanised steel and Aluminium with the benefit of light etching prior to further pre-treatment. The system is designed to produce a chemically clean surface to give uniformity of reaction during subsequent processing. It is particularly suited to spray operations, because of its low foaming characteristics. Extremely efficient in high pressure zones exceeding 1.8 psi

Operation:

PHOS-PREP® PP 931 Cleaner should be made up in clean water at a nominal concentration of 40 to 60 litres per 1000 litres bath volume (i.e. 4 to 6% v/v), although this may be varied if appropriate.

Typical make up solutions for aluminium are between 1.6 to 4% v/v to prevent attack of the aluminium substrate.

The solution should be operated at temperatures between 45°C and 65°C, processing times would be between 1 and 5 minutes, depending on the amount of cleaning required.

Spray pressure should be in the range of 10 to 25 psi

Plant:

The process tank and spray bars should be manufactured from mild steel, due to spray nozzles and pump impellers for spraying are subject to velocities these parts should be manufactured from 316 grade stainless steel, cast iron is suitable for the pump casings and volutes.

Aluminium, Copper, Zinc, or alloys that contain these materials such as brass and bronze are not suitable for use with the **PHOS-PREP®** PP 931

Solution Control:

Transfer a 50ml sample of the working bath into a titration flask and add 50ml clean water and a few drops of phenolphthalein indicator solution. Titrate against normal (molar) hydrochloric acid until the deep pink colour disappears.

Bath Concentration (points) = ml M HCl x 0.40

Handling and Personnel & Safety:

There are no special storage requirements for this product. When handling the product, protective PVC gloves, apron and goggles to BS 2092C should be worn.

In the event of a spillage or contact with skin or clothing, drench with plenty of water. In case of eye contact, irrigate with copious amounts of clean water and seek medical attention immediately.

Product safety data sheet:

A safety data sheet is available **PHOS-PREP®** PP 931 is part of the **PHOS-PREP®** range of products for the treatment of iron, steel and aluminium at low temperatures

TECHNICAL DATA SHEET

PHOS-PREP® PP 932 ACID ETCH / DEGREASER FOR ALUMINIUM

Use:

The **PHOS-PREP®** PP 932 sulphuric acid based cleaner/etch has been specially formulated to remove scales and tarnish from aluminium to produce a chemically clean surface, especially magnesium oxides that can interfere with the subsequent **PHOS-PREP®** PP 920 / PP 971 T preparation processes.

Although **PHOS-PREP®** PP 932 contains an inbuilt surfactant system, it may be advisable to clean heavily oiled work in PP934 (an alkali immersion cleaner), followed by a rinse, prior to **PHOS-PREP** PP 932 acid etching. Alternatively, additions of **PHOS-PREP®** PP 975 & **PHOS-PREP®** PP 976 surfactant additives may be added to the **PHOS-PREP®** PP 932 working bath.

The etch rate from the **PHOS-PREP®** PP 932 treatment can be varied by adjustments to the immersion time, the bath temperature and bath concentrations.

Etch Rates Achieved

PHOS-PREP® PP 932 at 10% solution operating at 20 C for 10 minutes will achieve an etch rate of 1g m², increasing the operating temperature by 10 C will result in a doubling of the etch rate, therefore typical spray processes have contact time of 3 minutes will require a temperature of >50 C to obtain >2g m²

Plant & Equipment:

Acid resistant materials such as polypropylene, UPVC or polyethylene, 316 stainless, are preferred.

Operation:

The **PHOS-PREP®** PP932 bath is normally operated at ambient temperature, at a concentration of 2% to 10% v/v with a process time of 2 to 10 minutes. Add **PHOS-PREP®** PP 975 / PP 976 to improve the removal of light oils

For faster process times, or a deeper etched finish, the bath can be operated at stronger concentrations, elevated temperatures or longer process times.

The optimum bath strength should be maintained to produce consistent results. Additions to the bath can be made on the

basis of an assessment of the finish of standard of work, or by analysis of bath concentrations.

Following treatment in the **PHOS-PREP®** PP932 bath, the work should be adequately rinsed prior to further processing.

Control:

To a 20 ml bath sample add approximately 50 mls de-ionised water and 20 mls of 20% KF solution (when Required - normally when contaminated with aluminium from an old bath solution). Add 5 drops of the Phenolphthalein indicator

Titrate the sample against 1M sodium hydroxide solution using phenolphthalein indicator to a pink end point.

TITRE = % VOL / VOL PHOS-PREP PP932

**EXAMPLE: PHOS PREP PP 932 IS USED AT 5%
SOLUTION THE TITRATE FIGURE WILL BE 5**

TITRE = % VOL / VOL PHOS-PREP PP932

Product Safety Data Sheet:

A safety data sheet is available

PHOS-PREP® PP932. is part of the **PHOS-PREP®** range of products for the treatment of iron, steel and aluminium at low temperatures

TECHNICAL DATA SHEET

PHOS-PREP® PP 920 DRY-IN-PLACE POLYMER FOR ALUMINIUM & ZINC / MILD STEEL

Use:

PHOS-PREP® PP 920 is a non-chromate replacement for chromate based products for the pre-treatment of aluminium and aluminium alloys, magnesium and zinc (i.e. galvanised surfaces) & Mild steel. A very pale surface finish is produced, eliminating the possibility of pre-treatment staining being visible through the paint. The product gives excellent adhesion and corrosion resistance after subsequent painting or powder coating.

Equipment:

The recommended material of construction for tanks and pipe-work is 316 stainless steel, although some plastics or rubber may be suitable, provided there is no mechanical damage.

Process:

Appropriate chemical treatment ahead of **PHOS-PREP® PP 920** depends on the condition of the metal to be processed, but adequate cleaning and etching is recommended, so as to remove all dirt and grease and sufficient metal to comply with any required process standard. Any smut formed during etching should be removed.

For galvanised work, any white rust or oil should be removed with **PHOS-PREP® PP 931 / PP 932**, freshly galvanised material may be treated with **PHOS-PREP® PP 920** with no intermediate stage.

PHOS-PREP® PP 920 is a dry-in-place pre-treatment, the **PHOS-PREP® PP 920** stage should not be followed by rinsing.

Process Control:

(A) MAKE UP

A **PHOS-PREP® PP 920** bath should be made up in water by adding 20 litres of the **PHOS-PREP® PP 920** concentrate per 1000 litres of bath volume, such as to obtain the correct free acid pointage of between 1.6 and 2.4 (see the test method below).

The bath should be tested after thorough mixing.

(B) OPERATION

The process is designed as a replacement for chromate pre-treatment products. It will operate at a temperature from 15°C to 35°C, with an immersion time of between 2 and 3 minutes, or in a spray application of between 10 and 30 seconds.

It is recommended, if possible, that the **PHOS-PREP® PP 920** pre-treatment is dried off immediately after the subsequent rinse stages, using a temperature not exceeding 200°C. Recesses containing entrapped moisture should be blown dry with a jet of clean compressed air.

Laboratory Testing:

(A) FREE ACID POINTAGE

The bath is controlled by testing the acidity. Take a 25ml bath sample and add 10-12 drops of bromothymol blue indicator solution. Titrate against 0.1M sodium hydroxide solution until the colour changes from yellow/green to a deep blue/green.

The titre is the free acid pointage.

A value of 1.0 ml should be obtained - to replenish the bath, add 2 litres of **PHOS-PREP® PP 920** concentrate per 1000 litres of bath volume for each 0.1mls by which the free acid pointage needs to be increased.

Handling and Personnel & Safety:

There are no special storage requirements for this product. When handling the product, protective PVC gloves, apron and goggles to BS 2092C should be worn. In the event of a spillage or contact with skin or clothing, drench with plenty of water. In case of eye contact, irrigate with copious amounts of clean water and seek medical attention immediately.

Product safety data sheet:

A safety data sheet is available **PHOS-PREP® PP 920** is part of the **PHOS-PREP®** range of products for the treatment of iron, steel and aluminium at low temperatures

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