



Technologies

TECHNICAL BULLETIN

ABN: 82 001 302 996
135-141 Canterbury Road, Kilsyth Victoria 3137
Phone : (613) 9728 7200 Fax : (613) 9761 7179

PHOSBRITE® 171

1. INTRODUCTION

PHOSBRITE® 171 is a chemical polishing solution specifically developed to chemically polish aluminium. The major benefit of **PHOSBRITE® 171** over other nitric acid based processes is the lower emission of nitrous fumes.

PHOSBRITE® 171 produces a bright, reflective surface on a wide range of alloys based on aluminium of commercial, or higher purity by a simple dipping operation. The degree of brightness obtained is superior to that produced by mechanical polishing, and fine scratches and other imperfections are removed. Chemical polishing is an essential operation in the production of bright anodising for automobile parts and consumer durables, as well as for colour anodised goods.

PHOSBRITE® 171 is formulated for use in automatic or manual plants and comes ready for use.

2. PRODUCT DATA

PHOSBRITE® 171 is a concentrated blend of phosphoric, nitric and sulphuric acids with special additives.

Appearance:	Blue Coloured viscous liquid
Specification:	Nitric Acid (70% m/m): 6.0 – 8.0% v/v
	Density @ 20°C: 1.72 – 1.74

3. PROCESS

For a chemical brightener to work effectively, the formulation needs to consist of an acid capable of reacting with the aluminium, an oxidising agent which will be reduced during the reaction with the base metal, and a suitable oxide film remover.

4. OPERATING SUMMARY

CHEMICAL	BATH PREPARATION PER 1,000 L
PHOSBRITE® 171	AS SUPPLIED
OPERATION AND CONTROL	
TEMPERATURE	90 - 110°C
NITRIC ACID CONCENTRATION	6 – 8% v/v (as 70% m/m HNO ₃)
IMMERSION TIME	1 – 5 minutes

5. THE PROCESS

- a. Degrease work (if necessary)
- b. Water Rinse (if necessary)
- c. Chemically polish in **PHOSBRITE® 171**
- d. Water Rinse
- e. Desmut
- f. Water rinse followed by normal anodising processes

6. MATERIALS

PHOSBRITE® 171
 Nitric Acid 70% m/m
 Testing Reagents and glassware

7. EQUIPMENT

PHOSBRITE® 171 is corrosive to most metals. Tanks, pipework, fume extraction plant and heating equipment must be constructed from a high grade Stainless Steel eg. EN58J (316ELC).

8. TESTING AND CONTROL

The **PHOSBRITE® 171** process is controlled in the plant by specific gravity and titrations for Nitric Acid and Total Acid.

a. Sampling Procedure

Obtain about 200ml of sample from the working tank. It is important to ensure that the tank is thoroughly agitated so that a representative sample is obtained. The sample should be taken from below the surface of the liquid to ensure any contamination by impurities floating on the surface is avoided.

Cool the sample to 20°C, allowing sufficient time for all air bubbles to escape from the sample.

8. TESTING AND CONTROL cont.**b. Nitric Acid Content****i. Reagents**

- Ferrous Sulphate Heptahydrate (A.R.)
- Nitric Acid (70% m/m) S.G : 1.40
- Phosphoric Acid (85% m/m)
- Sulphuric Acid (98% m/m)

ii. Preparation of Ferrous Sulphate Solution

- Carefully add 50mL of 98% m/m Sulphuric Acid to 700ml deionised water and mix well.
- Add 265g FeSO₄. 7H₂O (A.R.) and mix well until dissolved
- Cool and make up to 1 Litre.

N.B. This reagent must be standardised weekly and stored in a dark, well stoppered bottle.

iii. Preparation of Nitric Acid Standard

- Carefully pipette 10mL of 70% m/m HNO₃ into a 100mL Standard Volumetric Flask and make up to volume with 85% m/m Phosphoric Acid.

iv. Standardisation of Ferrous Sulphate Solution

- Pipette a 5mL sample of the Standard Nitric Acid solution into a clean dry 250mL beaker (a flask must not be used)
- Add 80mL of concentrated phosphoric acid
- Stir while warming to 40 - 45°C
- Titrate with Ferrous Sulphate solution until the first permanent golden-brown colour is formed.

NOTE: Close to the end of the titration there will be numerous gas bubbles dispersed throughout the solution and reddish-brown fumes evolved. At the end point no fumes are evolved.

- Record the mL of Ferrous Sulphate Solution added as S (mL).

v. Determination of Nitric Acid in PHOSBRITE® 171

- Pipette a 5mL aliquot into a 250mL beaker as done in the standardising action.
- Repeat the titration procedure used in the standardisation of Ferrous Sulphate solution shown in Section 7 (b) (iv) above.
- Record the mL of Ferrous Sulphate added as T (mL).

CALCULATION

$$\% \text{ v/v Nitric Acid (70\% m/m)} = \frac{T \times 10}{S}$$

c. Total Acid

- Pipette a 25mL sample of the cooled brightener solution into a 250mL volumetric flask and dilute to volume with deionised water and mix well.
- Pipette 25mL of this solution into a flask
- Titrate with 1.0N Sodium Hydroxide until the first sign of Turbidity.

9. OPERATIONAL RECOMMENDATION

Checks for S.G and Nitric acid should be carried out on a regular basis to maintain the process.

If any operating condition changes, eg. new grade of alloy, then checks should be made more frequently until the new operating and replenishment schedules are established.

10. PACKAGING

PHOSBRITE® 171 is supplied in 340 Kg closed head, returnable, poly lined steel drums, 1700 Kg IBC's and in bulk tankers.

11. STORAGE

PHOSBRITE® 171 should be stored in a cool, dry area away from heat and direct sunlight. Good stock rotation practices should be employed to ensure that the oldest stock is used first.

12. HANDLING

PHOSBRITE® 171 is a blend of strong acids. Always avoid contact with skin, eyes and clothing. Operators should always wear protective clothing, rubber or PVC gloves and close fitting goggles or face shield when handling the product or sampling the working bath.

13. POISONS ACT

PHOSBRITE® 171 is listed in Schedule one of the Uniform Poisons Act and can only be sold to customers possessing the appropriate licence.

14. SAFETY

Further information on safe handling and storage of **PHOSBRITE® 171** can be obtained by reading the MSDS.

PHOSBRITE® 171 is registered Trade Mark of Albright and Wilson (Australia) Limited and is specifically manufactured and distributed under licence by Henkel Australia Pty Ltd.

DISCLAIMER

Any information given is, to the best of our knowledge, the best currently available, with respect to our products and their use, but it is subject to revision as additional knowledge and experience is gained. Such information is offered as a guideline for experimentation only and is not to be construed as a representation that the material is suitable for any particular purpose or use. Customers are encouraged to make their own enquiries as to the material's characteristics and, where appropriate, to conduct their own tests in the specific context of the material's intended use. This information is not a license to operate under nor is it intended to suggest infringement of any patent. We guarantee a uniform quality standard for this product. The only conditions and warranties accepted by Henkel in relation to this product or process are those implied by either Commonwealth or State statutes.