



**CANNOCK CHEMICALS LTD**

**MANUFACTURERS AND DISTRIBUTORS TO THE  
METAL FINISHING INDUSTRY**

UK Distributors of XSTRATA NICKEL Products  
Agents for Atotech and MacDermid/Enthone Products  
Sole UK Agent for Kocour Laboratory Equipment

## Mansol Blacking Salts

### Information Sheet

#### 1. PRODUCT DESCRIPTION

"Mansol Blacking Salts" salts is a caustic alkaline free flowing powder which produces a black oxide finish on mild steel by the conversion of the surface to Fe<sub>3</sub>O<sub>4</sub>, giving a decorative black finish which offers no dimensional change making it ideal for machine tool, armament and instrument manufacturers.

#### 2. DIRECTIONS FOR USE

Possible 1 or 2 tank system.

Tank 1-1600gms per litre

Tank 2-2000gms per litre (optional)

Caution: Eye protection and safety clothing must be worn when making up the bath and while operating the process.

Start with around 100— 200ml of cold water in the tank and slowly add the salts whilst constantly stirring until no more will dissolve. As the salts dissolve, they generate considerable heat and this first low-level make-up will allow expansion space in the tank for initial foaming-up. Next add sufficient cold water to raise the level to within 15 — 20cm off the top of a small tank and about 25 cms off the top of a large tank. Slowly and carefully add the remainder of the " Mansol Blacking Salts" salts continuing to stir and when they have dissolved, heat the solution and bring to the boil. Record the temperature with an accurate thermometer.

If the solution boils above 143C on a tank No add water slowly and carefully to lower the concentration and the boiling point. If the solution boils below 143C add " Mansol Blacking Salts" salts in small quantities to raise the concentration and boiling point.

99a North Street, Bridgtown, Cannock, Staffordshire, WS11 0AZ

Registered in England 1643201

Tel: 01543-571762 or 01543-505771 Fax: 01543-466011

Email: [mark.malpass@cannockchemicals.com](mailto:mark.malpass@cannockchemicals.com) [tim.forrester@cannockchemicals.com](mailto:tim.forrester@cannockchemicals.com)

DIRECTORS: Mark Malpass (Managing), Christina Malpass (Co Sec) Peter Malpass, Andrew Malpass





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### 3. CONDITIONS OF USE

The solution may be operated at a boiling point of 143C (tank 1.) & 154C (tank 2.)  
Immersion times are normally 10-15 minutes depending on the type of steel being processed.  
Do not leave components in the solution longer than is necessary.

### 4. MAINTENANCE

Solution is lost through drag-out and water is lost through evaporation. The solution should be maintained at a constant volume and boiling point by the addition of the Mansol Blacking Salts and water. Maintenance additions can be made at any time providing there is no work being processed. The correct ratio between salts and water is critical and maintenance must not be neglected.

#### Addition of the Salts

This is required when the boiling point is low. Salts should be added very slowly, with stirring to prevent boil over until the boiling temperature rises to the operating level. If the volume of the tank is too low due to drag-out losses, estimate the volume loss and add 500 g/l of Mansol Blacking salts. Finally, correct boiling point with water if required. If the volume is high and the boiling point too low it is better to allow water to evaporate to restore the boiling point and lower the volume.

#### Addition of Water

Water is required when the boiling point is too high and the volume is too low. Water should always be added very cautiously to the salts bath by running it slowly into a corner of the tank. Because of the high temperature some spluttering may occur and a splash guard or shield may be placed to cover the corner. If the operative is inexperienced, it is preferable to cool the bath to 100C before diluting it and raising the temperature again. The addition of water should continue until the boiling temperature is correct. If the volume is too high before the correct boiling point is reached, due to over addition of salts, some solution must be taken out of the tank. Do not add water below the level of the solution as an explosion could result.

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## 5. OPERATING PROCEDURE

Blackening salts can be used in a one or two tank installations with a bath make-up 1600 grams per litre to give a simmer boil at a temperature of 143C.

1. Alkaline Cleaner (Mansol S100) 75 - 85C
2. De-Rust/De-Scale (optional)
3. Water Rinse
4. Water Rinse
5. Mansol Blackening Salts Tank 1. 143C
6. Mansol Blackening Salts Tank 2. 154C (optional)
7. Water Rinse
8. Water Rinse
9. Hot Rinse
10. De-watering Oil (DW21)

## 6. TROUBLE SHOOTING/HELPFUL HINTS

1. If work comes from the first tank brown or green the tank is too strong and water should be added.
2. If work comes from the first tank grey, the tank is too weak and "Black Lustre" salts should be added.
3. If work comes from the second tank an iridescent wine colour a longer immersion time is required.
4. Work should be agitated every 5 minutes or so in tank 1. to allow touching surfaces to be processed.
5. If work comes from the second tank with bare patches the cleaning has not been sufficient and work should be taken back to the alkaline cleaner.
6. Great care should be taken when adding water as this will cause a rapid boiling reaction and spitting which could cause burns.
7. When a plant is restarted after a period without use it should be stirred regularly to prevent sudden boiling of the solution causing it to overflow.

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## 7. EQUIPMENT

Tanks, fixtures, pipes, heaters and extraction hoods should be constructed from mild steel only. All joints and seams should be welded. It is recommended that efficient fume extraction is fitted. Heating may be gas burners under the tank or by steel steam coils in the tank or steel-clad electric immersion heaters.

Temperature control is critical and a direct reading dial type thermometer is an advantage. A volume level indicator is also recommended to avoid guess work in maintenance.

## 8. SAFETY IN HANDLING AND USE

The prefix letter to each product commodity number is a safety code fully explained in the Material Safety Data Sheet (M.S.D.S.). The following information relates to highly alkaline salts which contain sodium hydroxide.

Corrosive (Alkaline)

Hazards

Sodium Hydroxide (caustic soda) is a highly alkaline, corrosive material which can cause severe burns if handled without protection or if inhaled as a dust. It will cause degradation or decomposition of normal clothing materials.

Reaction of the solid will generate considerable heat. Avoid ingestion, contact with skin, inhalation of dust or contaminated clothing.

These solutions represent an additional hazard — operating above the boiling point of water. Extreme caution should be exercised when adding water to the solution.

Storage and Handling

Corrosive alkalis should be kept sealed away from foodstuffs and acids in a cool dry place. Prolonged storage, over six months may possibly affect the performance of the material, therefore, stock should be rotated. Contact with salts or solutions must be avoided. When measuring out salts or powders, approved eye protection must be worn. Suitable safety

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clothing should be worn and this should be cleaned down after use. Scoops and measures should be washed after use. Personnel should wash thoroughly after handling this material.

## Protective Clothing

Where there is any danger of solution splashes, approved eye protection must be worn. When operating the Mansol Blacking Salts process or when preparing or making additions to the solutions, protective clothing should be worn. The materials in this User Instruction sheet will cause degradation or decomposition of normal clothing materials such as cotton or nylon, therefore a rubber or PVC apron, boots and gauntlet gloves should be worn.

### Treatment in the Event of Skin Contact

Any corrosive solution splashed onto the skin should be immediately washed off with copious amounts of water and then washed with a buffered phosphate solution, a weak boric acid solution or a 5% acetic acid or vinegar solution. Any contaminated clothing should be completely flooded through with water before attempting removal.

## Disposal

Appropriate provision should be made for the treatment of rinse waters in accordance with Water Authority requirements. Any minor spillage of solution should be diluted with water and washed in to the effluent treatment plant.

Any information given here relating to Health and Safety should be regarded as general advice and is not regarded as comprehensive or definitive.

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