

## SAFETY DATA SHEET

# 085

Product Name **PHOSPHINE**

### 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

|               |                                                                                       |
|---------------|---------------------------------------------------------------------------------------|
| Supplier Name | BOC LIMITED (AUSTRALIA)                                                               |
| Address       | 10 Julius Avenue, North Ryde, NSW, AUSTRALIA, 2113                                    |
| Telephone     | 131 262, (02) 8874 4400                                                               |
| Fax           | 132 427 (24 hours)                                                                    |
| Emergency     | 1800 653 572 (24/7) (Australia only)                                                  |
| Web Site      | <a href="http://www.boc.com.au/">http://www.boc.com.au/</a>                           |
| Synonym(s)    | 085 - SDS NUMBER • HYDROGEN PHOSPHIDE • PHOSPHATED HYDROGEN • PRODUCT CODES: 160, 175 |
| Use(s)        | CHEMICAL REAGENT                                                                      |
| SDS Date      | 26 Mar 2010                                                                           |

### 2. HAZARDS IDENTIFICATION

CLASSIFIED AS HAZARDOUS ACCORDING TO ASCC CRITERIA

#### RISK PHRASES

|     |                                  |
|-----|----------------------------------|
| R12 | Extremely Flammable.             |
| R17 | Spontaneously flammable in air.  |
| R26 | Very toxic by inhalation.        |
| R34 | Causes burns.                    |
| R50 | Very toxic to aquatic organisms. |

#### SAFETY PHRASES

|        |                                                                                                            |
|--------|------------------------------------------------------------------------------------------------------------|
| S28    | After contact with skin, wash immediately with plenty of water.                                            |
| S36/37 | Wear suitable protective clothing and gloves.                                                              |
| S45    | In case of accident or if you feel unwell seek medical advice immediately (show the label where possible). |
| S61    | Avoid release to the environment. Refer to special instructions / safety data sheets.                      |
| S63    | In case of accident by inhalation, remove casualty to fresh air and keep at rest.                          |

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

|               |                |              |     |                    |     |
|---------------|----------------|--------------|-----|--------------------|-----|
| UN No.        | 2199           | DG Class     | 2.3 | Subsidiary Risk(s) | 2.1 |
| Packing Group | None Allocated | Hazchem Code | 2WE | EPG                | 2B2 |

### 3. COMPOSITION/ INFORMATION ON INGREDIENTS

| Ingredient | Formula | CAS No.   | Content  |
|------------|---------|-----------|----------|
| PHOSPHINE  | H3-P    | 7803-51-2 | >99.999% |

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**4. FIRST AID MEASURES**

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|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Eye</b>              | Cold burns: Immediately flush with tepid water or with sterile saline solution. Hold eyelids apart and irrigate for 15 minutes. Seek medical attention.                                                                                                                                                                                                 |
| <b>Inhalation</b>       | If inhaled, remove from contaminated area. To protect rescuer, use an Air-line respirator or Self Contained Breathing Apparatus (SCBA). Be aware of possible explosive atmospheres. Apply artificial respiration if not breathing. Give oxygen if available. For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor. |
| <b>Skin</b>             | Cold burns: Remove contaminated clothing and gently flush affected areas with warm water (30°C) for 15 minutes. Apply sterile dressing and treat as for a thermal burn. For large burns, immerse in warm water for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention.                                                  |
| <b>Ingestion</b>        | Due to product form and application, ingestion is considered unlikely.                                                                                                                                                                                                                                                                                  |
| <b>Advice to Doctor</b> | Treat symptomatically                                                                                                                                                                                                                                                                                                                                   |

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**5. FIRE FIGHTING MEASURES**

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|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Flammability</b>       | Highly flammable. May spontaneously ignite in air. May evolve toxic gases (phosphorus oxides) when heated to decomposition. Eliminate all ignition sources, including cigarettes, open flames, electrical equipment, spark producing switches/tools, heaters, pilot lights etc when handling.                                                                                                                                                                                                                                           |
| <b>Fire and Explosion</b> | Temperatures in a fire may cause cylinders to rupture and internal pressure relief devices to be activated. Cool cylinders or containers exposed to fire by applying water from a protected location. Do not approach cylinders or containers suspected of being hot. This material is capable of forming explosive mixtures in air.                                                                                                                                                                                                    |
| <b>Extinguishing</b>      | Stop flow of gas if safe to do so, such as by slowly closing the cylinder valve. If the gas source cannot be isolated, do not extinguish the flame, since re-ignition and explosion could occur. Await arrival of emergency services or manufacturer's advisor. Drench and cool cylinders with water spray from protected area at a safe distance. If it is absolutely necessary to extinguish the flame, use only a dry chemical powder extinguisher. Do not move cylinders for at least 24 hours. Avoid shock and bumps to cylinders. |
| <b>Hazchem Code</b>       | 2WE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

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**6. ACCIDENTAL RELEASE MEASURES**

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|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Spillage</b> | If the cylinder is leaking, eliminate all potential ignition sources and evacuate area of personnel. Prevent spreading of vapours through drains and ventilation systems. Inform manufacturer/supplier of leak. Use personal protective equipment. Carefully move material to a well ventilated remote area, then allow to discharge. Do not attempt to repair leaking valve or cylinder safety devices. |
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**7. STORAGE AND HANDLING**

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|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Storage</b>  | Do not store near sources of ignition or incompatible materials. Cylinders should be stored below 45°C in a secure area, upright and restrained to prevent cylinders from falling. Cylinders should also be stored in a dry, well ventilated area constructed of non-combustible material with firm level floor (preferably concrete), away from areas of heavy traffic and emergency exits. |
| <b>Handling</b> | Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Do not drag, drop, slide or roll cylinders. The uncontrolled release of a gas under pressure may cause physical harm. Use a suitable hand truck for cylinder movement.                                                                                                                               |

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**8. EXPOSURE CONTROLS/ PERSONAL PROTECTION**

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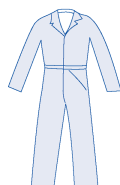
|                          |                                |
|--------------------------|--------------------------------|
| <b>Exposure Std</b>      | PHOSPHINE                      |
|                          | ES-TWA: 0.3 ppm Phosphine      |
|                          | WES-TWA: 0.3 ppm (0.42 mg/m3)  |
| <b>Biological Limits</b> | No biological limit allocated. |

**Product Name****PHOSPHINE****Engineering Controls**

Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical explosion proof extraction ventilation is recommended. Flammable/explosive vapours may accumulate in poorly ventilated areas. Vapours are heavier than air and may travel some distance to an ignition source and flash back. Maintain vapour levels below the recommended standard. Maintain vapour levels below the recommended exposure standard.

**PPE**

Wear safety or rubber boots, butyl or PVC gloves, coveralls and an Air-line respirator or self Contained Breathing Apparatus (SCBA). Only experienced and trained person should use this product.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

|                          |                   |                              |                  |
|--------------------------|-------------------|------------------------------|------------------|
| <b>Appearance</b>        | COLOURLESS GAS    | <b>Solubility (Water)</b>    | NOT AVAILABLE    |
| <b>Odour</b>             | ROTTEN FISH ODOUR | <b>Specific Gravity</b>      | NOT APPLICABLE   |
| <b>pH</b>                | NOT APPLICABLE    | <b>% Volatiles</b>           | 100 %            |
| <b>Vapour Pressure</b>   | 4190 kPa @ 25°C   | <b>Flammability</b>          | HIGHLY FLAMMABLE |
| <b>Vapour Density</b>    | NOT AVAILABLE     | <b>Flash Point</b>           | < 23°C           |
| <b>Boiling Point</b>     | -87.7°C           | <b>Upper Explosion Limit</b> | 100 %            |
| <b>Melting Point</b>     | NOT AVAILABLE     | <b>Lower Explosion Limit</b> | 1.18 %           |
| <b>Evaporation Rate</b>  | NOT APPLICABLE    |                              |                  |
| <b>Critical Pressure</b> | 6535 kPa          | <b>Critical Temperature</b>  | 51.6°C           |
| <b>Density</b>           | 1.18 (Air = 1)    |                              |                  |

**10. STABILITY AND REACTIVITY**

|                            |                                                                                                                    |
|----------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>Material to Avoid</b>   | Incompatible (violently) with oxygen, halogens, nitric acid and some chlorides and nitrates. Corrosive when moist. |
| <b>Decomposition</b>       | May evolve toxic gases (phosphorus oxides) when heated to decomposition.                                           |
| <b>Hazardous Reactions</b> | Polymerization will not occur.                                                                                     |

**11. TOXICOLOGICAL INFORMATION**

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Health Hazard Summary</b> | Highly toxic. Primary hazard is phosphine which acts on the central nervous system, lungs, heart and may result in injury to kidneys and other organs. Sub-acute exposure may result in anaemia, bronchitis, gastro-intestinal disorder, speech and motor disturbances (double vision, tremor and gait difficulties. Symptoms usually appear rapidly but may be delayed 1 to 3 days. Symptoms at higher exposure include faintness, weakness, apathy, nausea, vomiting, diarrhoea, tremors, intense thirst, abdominal pain, oppressed feeling in chest, dyspnoea, cough with sputum, coughing of frothy liquid, convulsions, paralysis and coma. It has been claimed that chronic exposure may effect the bones in a manner similar to white phosphorous, but such exposure is unlikely. |
| <b>Eye</b>                   | Irritant vapour. Low temperature evaporating liquid can cause cold burns.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Inhalation</b>            | Highly toxic - severe irritant. Effects may be delayed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Skin</b>                  | Irritating vapour. Direct contact with the liquefied material or escaping compressed gas may cause frost-bite injury.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Ingestion</b>             | Ingestion is considered unlikely due to product form. However, ingestion of liquid may result in burns to the mouth and throat.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Toxicity Data</b>         | PHOSPHINE (7803-51-2)<br>LC50 (Inhalation): 11ppm/4 hours (rat)<br>LCLo (Inhalation): 1000ppm/5min (human)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

**12. ECOLOGICAL INFORMATION**

|                    |                                                                                                                                                                                            |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Environment</b> | Limited ecotoxicity data was available for this product at the time this report was prepared. Ensure appropriate measures are taken to prevent this product from entering the environment. |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 13. DISPOSAL CONSIDERATIONS

|                       |                                                                                        |
|-----------------------|----------------------------------------------------------------------------------------|
| <b>Waste Disposal</b> | Cylinders should be returned to the manufacturer or supplier for disposal of contents. |
| <b>Legislation</b>    | Dispose of in accordance with relevant local legislation.                              |

### 14. TRANSPORT INFORMATION

|                  |                                                          |
|------------------|----------------------------------------------------------|
| <b>Transport</b> | Ensure cylinder is separated from driver and foodstuffs. |
|------------------|----------------------------------------------------------|



#### CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

|                      |                |                     |     |                           |     |
|----------------------|----------------|---------------------|-----|---------------------------|-----|
| <b>Shipping Name</b> | PHOSPHINE      |                     |     |                           |     |
| <b>UN No.</b>        | 2199           | <b>DG Class</b>     | 2.3 | <b>Subsidiary Risk(s)</b> | 2.1 |
| <b>Packing Group</b> | None Allocated | <b>Hazchem Code</b> | 2WE | <b>EPG</b>                | 2B2 |

### 15. REGULATORY INFORMATION

|                        |                                                                                                                                    |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Poison Schedule</b> | Classified as a Schedule 7 (S7) Poison using the criteria in the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP). |
| <b>AICS</b>            | All chemicals listed on the Australian Inventory of Chemical Substances (AICS).                                                    |

### 16. OTHER INFORMATION

|                               |                                                                                                                                |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>Additional Information</b> | The storage of significant quantities of gas cylinders must comply with AS4332 The storage and handling of gases in cylinders. |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------|

APPLICATION METHOD: Gas regulator of suitable pressure and flow rating fitted to cylinder or manifold with low pressure gas distribution to equipment.

#### ABBREVIATIONS:

ADB - Air-Dry Basis.  
 BEI - Biological Exposure Indice(s)  
 CAS# - Chemical Abstract Service number - used to uniquely identify chemical compounds.  
 CNS - Central Nervous System.  
 EINECS - European INventory of Existing Commercial chemical Substances.  
 IARC - International Agency for Research on Cancer.  
 M - moles per litre, a unit of concentration.  
 mg/m3 - Milligrams per cubic metre.  
 NOS - Not Otherwise Specified.  
 NTP - National Toxicology Program.  
 OSHA - Occupational Safety and Health Administration.  
 pH - relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).  
 ppm - Parts Per Million.  
 RTECS - Registry of Toxic Effects of Chemical Substances.  
 TWA/ES - Time Weighted Average or Exposure Standard.

#### HEALTH EFFECTS FROM EXPOSURE:

It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a Chem Alert report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

#### PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:

The recommendation for protective equipment contained within this Chem Alert report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

|                      |                                                                                                                                                 |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Report Status</b> | This document has been compiled by RMT on behalf of the manufacturer of the product and serves as the manufacturer's Safety Data Sheet ('SDS'). |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|

**Product Name****PHOSPHINE**

It is based on information concerning the product which has been provided to RMT by the manufacturer or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

**Prepared By**

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**SDS Date:** 26 Mar 2010

**End of Report**