

SAFETY DATA SHEET

3204

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name 12 COMPONENT MIXTURE (BALANCE H₂)
Synonyms 3204 - SDS NUMBER • CCS21091E - MATERIAL NUMBER

1.2 Uses and uses advised against

Uses CALIBRATION • INDUSTRIAL APPLICATIONS

1.3 Details of the supplier of the product

Supplier name BOC LIMITED (AUSTRALIA)
Address 10 Julius Avenue, North Ryde, NSW, 2113, AUSTRALIA
Telephone 131 262, (02) 8874 4400
Fax 132 427 (24 hours)
Website <http://www.boc.com.au>

1.4 Emergency telephone numbers

Emergency 1800 653 572 (24/7) (Australia only)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

GHS classifications Flammable Gases: Category 1
Gases Under Pressure: Compressed gas
Acute Toxicity: Inhalation: Category 4
Toxic to Reproduction: Category 1A
Specific Target Organ Systemic Toxicity (Repeated Exposure): Category 1
Aquatic Toxicity (Acute): Category 1

2.2 Label elements

Signal word DANGER

Pictograms



Hazard statements

H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.
H332 Harmful if inhaled.
H360 May damage fertility or the unborn child.
H372 Causes damage to organs through prolonged or repeated exposure.
H400 Very toxic to aquatic life.

PRODUCT NAME 12 COMPONENT MIXTURE (BALANCE H2)

Prevention statements

| | |
|------|---|
| P201 | Obtain special instructions before use. |
| P202 | Do not handle until all safety precautions have been read and understood. |
| P210 | Keep away from heat/sparks/open flames/hot surfaces. No smoking. |
| P260 | Do not breathe dust/fume/gas/mist/vapours/spray. |
| P264 | Wash thoroughly after handling. |
| P270 | Do not eat, drink or smoke when using this product. |
| P271 | Use only outdoors or in a well-ventilated area. |
| P273 | Avoid release to the environment. |
| P281 | Use personal protective equipment as required. |

Response statements

| | |
|-------------|---|
| P304 + P340 | IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. |
| P308 + P313 | IF exposed or concerned: Get medical advice/ attention. |
| P377 | Leaking gas fire: Do not extinguish, unless leak can be stopped safely. |
| P381 | Eliminate all ignition sources if safe to do so. |
| P391 | Collect spillage. |

Storage statements

| | |
|-------------|--|
| P405 | Store locked up. |
| P410 + P403 | Protect from sunlight. Store in a well-ventilated place. |

Disposal statements

| | |
|------|--|
| P501 | Dispose of contents/container in accordance with relevant regulations. |
|------|--|

2.3 Other hazards

Asphyxiant. Effects are proportional to oxygen displacement.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

| Ingredient | CAS Number | EC Number | Content (v/v) |
|--|------------|-----------|---------------|
| HYDROGEN | 1333-74-0 | 215-605-7 | Remainder |
| CARBON MONOXIDE | 630-08-0 | 211-128-3 | 10 to 30% |
| CARBON DIOXIDE | 124-38-9 | 204-696-9 | <20% |
| ETHANE | 74-84-0 | 200-814-8 | <10% |
| METHANE | 74-82-8 | 200-812-7 | <10% |
| NITROGEN | 7727-37-9 | 231-783-9 | <10% |
| PROPANE | 74-98-6 | 200-827-9 | <10% |
| BUTANE | 106-97-8 | 203-448-7 | <5% |
| ISOBUTANE (CONTAINING <0.1% BUTADIENE) | 75-28-5 | 200-857-2 | <5% |
| ISOPENTANE | 78-78-4 | 201-142-8 | <5% |
| PENTANE | 109-66-0 | 203-692-4 | <5% |
| HYDROGEN SULPHIDE | 7783-06-4 | 231-977-3 | <1% |

4. FIRST AID MEASURES

4.1 Description of first aid measures

| | |
|----------------------|---|
| Eye | None required. |
| Inhalation | 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. |
| Skin | None required. |
| Ingestion | Due to product form and application, ingestion is considered unlikely. |
| First aid facilities | None allocated. |

4.2 Most important symptoms and effects, both acute and delayed

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility / consciousness. Victim may not be aware of asphyxiation. In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination. Over exposure to carbon monoxide may result in rapid breathing, nausea, lack of coordination, unconsciousness and coma. Carbon monoxide reacts with haemoglobin in the blood to prevent oxygen uptake and release. May cause harm to the unborn child.

4.3 Immediate medical attention and special treatment needed

Treat symptomatically.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Stop flow of gas if safe to do so, such as by slowly closing the cylinder valve.

5.2 Special hazards arising from the substance or mixture

Extremely flammable. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, mobile phones etc. when handling.

5.3 Advice for firefighters

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.

5.4 Hazchem code

2SE
2 Fine Water Spray.
S Risk of violent reaction or explosion. Wear full fire kit and breathing apparatus. Dilute spill and run-off.
E Evacuation of people in and around the immediate vicinity of the incident should be considered.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

If the cylinder is leaking, evacuate area of personnel. Inform manufacturer/supplier of leak. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation. Eliminate all sources of ignition. Consider the risk of potentially explosive atmospheres.

6.2 Environmental precautions

Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3 Methods of cleaning up

Carefully move material to a well ventilated remote area, then allow to discharge if safe to do so. Do not attempt to repair leaking valve or cylinder safety devices.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Use of safe work practices are recommended to avoid 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.

7.2 Conditions for safe storage, including any incompatibilities

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.

7.3 Specific end uses

No information provided.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

| Ingredient | Reference | TWA | | STEL | |
|------------------------------|-----------|------------|-------------------|-------|-------------------|
| | | ppm | mg/m ³ | ppm | mg/m ³ |
| Butane | SWA (AUS) | 800 | 1900 | -- | -- |
| Carbon dioxide | SWA (AUS) | 5000 | 9000 | 30000 | 54000 |
| Carbon dioxide in coal mines | SWA (AUS) | 12500 | 22500 | 30000 | 54000 |
| Carbon monoxide | SWA (AUS) | 30 | 34 | -- | -- |
| Ethane | SWA (AUS) | Asphyxiant | | | |
| Hydrogen | SWA (AUS) | Asphyxiant | | | |
| Hydrogen Sulphide | SWA (AUS) | 10 | 14 | 15 | 21 |
| Isobutane | SWA (AUS) | 1000 | -- | -- | -- |
| Methane | SWA (AUS) | Asphyxiant | | | |
| Nitrogen | SWA (AUS) | Asphyxiant | | | |
| Pentane | SWA (AUS) | 600 | 1770 | 750 | 2210 |
| Propane | SWA (AUS) | Asphyxiant | | | |

Biological limits

| Ingredient | Determinant | Sampling Time | BEI |
|-----------------|------------------------------------|---------------|--------------------|
| CARBON MONOXIDE | Carboxyhemoglobin in blood | End of shift | 3.5% of hemoglobin |
| | Carbon monoxide in end-exhaled air | End of shift | 20 ppm |

Reference: ACGIH Biological Exposure Indices

8.2 Exposure controls

Engineering controls

Provide suitable ventilation to minimise or eliminate exposure. Confined areas (e.g. tanks) should be adequately ventilated or gas tested. Flammable/explosive vapours may accumulate in poorly ventilated areas. Maintain vapour levels below the recommended exposure standard.

PPE

| | |
|--------------------|--|
| Eye / Face | Wear safety glasses. |
| Hands | Wear leather gloves. |
| Body | Wear safety boots. |
| Respiratory | Where an inhalation risk exists, wear Self Contained Breathing Apparatus (SCBA) or an Air-line respirator. |



9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

| | |
|-----------------------|---------------------|
| Appearance | COLOURLESS GAS |
| Odour | HYDROCARBON ODOUR |
| Flammability | EXTREMELY FLAMMABLE |
| Flash point | NOT AVAILABLE |
| Boiling point | NOT RELEVANT |
| Melting point | NOT RELEVANT |
| Evaporation rate | NOT APPLICABLE |
| pH | NOT APPLICABLE |
| Vapour density | NOT AVAILABLE |
| Specific gravity | NOT APPLICABLE |
| Solubility (water) | NOT SOLUBLE |
| Vapour pressure | NOT AVAILABLE |
| Upper explosion limit | 75 % (Hydrogen) |

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9.1 Information on basic physical and chemical properties

| | |
|---------------------------|----------------|
| Lower explosion limit | 4 % (Hydrogen) |
| Partition coefficient | NOT AVAILABLE |
| Autoignition temperature | NOT AVAILABLE |
| Decomposition temperature | NOT AVAILABLE |
| Viscosity | NOT AVAILABLE |
| Explosive properties | NOT AVAILABLE |
| Oxidising properties | NOT AVAILABLE |
| Odour threshold | NOT AVAILABLE |

9.2 Other information

| | |
|-------------|-------|
| % Volatiles | 100 % |
|-------------|-------|

10. STABILITY AND REACTIVITY

10.1 Reactivity

Carefully review all information provided in sections 10.2 to 10.6.

10.2 Chemical stability

Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions

Polymerization will not occur.

10.4 Conditions to avoid

Avoid heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials

Carbon monoxide can react with iron, nickel and other metals. Below 3,500 kPa corrosion is negligible and common materials can be used. Incompatible with acrylaldehyde, aziridine, sodium peroxide. Corrosive when moist.

10.6 Hazardous decomposition products

This material will not decompose to form hazardous products other than that already present.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity Harmful if inhaled. Carbon monoxide effects depend on the percentage of carboxyhaemoglobin: 10-20% mild headache and breathlessness on mild exertion; 20-30% headache, irritability, rapid fatigue and impaired memory; 30-40% severe headache, weakness, nausea, vomiting, dizziness, visual impairment and confusion; 40-50% increasing confusion, ataxia and collapse; 50-60% coma; >80% rapid death.

Information available for the ingredients:

| Ingredient | Oral Toxicity (LD50) | Dermal Toxicity (LD50) | Inhalation Toxicity (LC50) |
|-------------------|-----------------------|------------------------|----------------------------|
| CARBON MONOXIDE | -- | -- | 1807 ppm/4H (rat) |
| ETHANE | -- | -- | 658 mg/L/4hrs (rat) |
| PROPANE | Study technically not | Study technically not | > 800000 ppm/15M (rat) |
| BUTANE | Study technically not | Study technically not | 658000 mg/m3/4H (rat) |
| ISOPENTANE | > 2000 mg/kg (rat) | -- | > 20 mg/L (rat) |
| HYDROGEN SULPHIDE | -- | -- | 712 ppm |

| | |
|-------------------------------|--|
| Skin | Not classified as a skin irritant. |
| Eye | Not classified as an eye irritant. |
| Sensitisation | Not classified as causing skin or respiratory sensitisation. |
| Mutagenicity | Not classified as a mutagen. |
| Carcinogenicity | Not classified as a carcinogen. |
| Reproductive | May cause harm to the unborn child. Exposure to carbon monoxide can result in developmental defects on foetuses without maternal symptoms. |
| STOT - single exposure | Asphyxiant. Effects are proportional to oxygen displacement. Over exposure may result in dizziness, drowsiness, weakness, fatigue, breathing difficulties and unconsciousness. |
| STOT - repeated | Increased evidence of cardiovascular problems have been demonstrated upon chronic exposure to carbon |

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| | |
|-------------------|---|
| exposure | monoxide. Can aggravate some diseases of the cardiovascular system such as coronary artery disease. The effect is enhanced by cigarette smoking. Adverse behavioural effects have been noted including impairment of vigilance, co-ordination, timing, behaviour, visual perception and certain cognitive functions. Some adaptation occurs in individuals repeatedly exposed to moderate concentrations. |
| Aspiration | Not classified as causing aspiration. |

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Very toxic to aquatic life.

12.2 Persistence and degradability

No information provided.

12.3 Bioaccumulative potential

No information provided.

12.4 Mobility in soil

No information provided.

12.5 Other adverse effects

When discharged to the atmosphere, carbon dioxide and methane may contribute to the greenhouse effect. Methane has a global warming potential of 21 (CO₂ = 1). Carbon monoxide is slowly oxidised in the atmosphere to carbon dioxide.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal Cylinders should be returned to the manufacturer or supplier for disposal of contents.

Legislation Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

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



| | LAND TRANSPORT (ADG) | SEA TRANSPORT (IMDG / IMO) | AIR TRANSPORT (IATA / ICAO) |
|------------------------------------|---|---|---|
| 14.1 UN Number | 1954 | 1954 | 1954 |
| 14.2 Proper Shipping Name | COMPRESSED GAS, FLAMMABLE, N.O.S. (Contains hydrogen) | COMPRESSED GAS, FLAMMABLE, N.O.S. (Contains hydrogen) | COMPRESSED GAS, FLAMMABLE, N.O.S. (Contains hydrogen) |
| 14.3 Transport hazard class | 2.1 | 2.1 | 2.1 |
| 14.4 Packing Group | None allocated. | None allocated. | None allocated. |

14.5 Environmental hazards

Marine Pollutant

14.6 Special precautions for user

| | |
|--------------------------|--|
| Hazchem code | 2SE |
| GTEPG | 2A1 |
| EMS | F-D, S-U |
| Other information | Ensure cylinder is separated from driver and that outlet of relief device is not obstructed. Refer to Commonwealth, State and Territory Dangerous Goods Legislation which contain requirements which affect gas storage and transport. |

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

| | | |
|---------------------------|--|--|
| Poison schedule | Classified as a Schedule 7 (S7) Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP). | |
| Classifications | <p>Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.</p> <p>The classifications and phrases listed below are based on the Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008(2004)].</p> | |
| Hazard codes | F+ | Extremely flammable |
| | N | Dangerous for the environment |
| | Repr. | Reproductive toxin |
| | T | Toxic |
| | Xn | Harmful |
| Risk phrases | R12 | Extremely Flammable. |
| | R20 | Harmful by inhalation. |
| | R48/23 | Toxic: danger of serious damage to health by prolonged exposure through inhalation. |
| | R50 | Very toxic to aquatic organisms. |
| | R61 | May cause harm to the unborn child. |
| Safety phrases | S9 | Keep container in a well ventilated place. |
| | S16 | Keep away from sources of ignition - No smoking. |
| | S33 | Take precautionary measures against static discharges. |
| | S45 | In case of accident or if you feel unwell seek medical advice immediately (show the label where possible). |
| | S53 | Avoid exposure - obtain special instructions before use. |
| | S61 | Avoid release to the environment. Refer to special instructions/safety data sheets. |
| Inventory listings | <p>AUSTRALIA: AICS (Australian Inventory of Chemical Substances)</p> <p>All components are listed on AICS, or are exempt.</p> | |

16. OTHER INFORMATION

| | |
|-------------------------------|--|
| Additional information | The storage of significant quantities of gas cylinders must comply with AS4332 The storage and handling of gases in cylinders. |
|-------------------------------|--|

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:

The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as form of product, 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.

HEALTH EFFECTS FROM EXPOSURE:

It should be noted that the effects from exposure to this product will depend on several factors including: form of product; 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 report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

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| | | |
|----------------------|-------------------|---|
| Abbreviations | ACGIH | American Conference of Governmental Industrial Hygienists |
| | CAS # | Chemical Abstract Service number - used to uniquely identify chemical compounds |
| | CNS | Central Nervous System |
| | EC No. | EC No - European Community Number |
| | EMS | Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods) |
| | GHS | Globally Harmonized System |
| | GTEPG | Group Text Emergency Procedure Guide |
| | IARC | International Agency for Research on Cancer |
| | LC50 | Lethal Concentration, 50% / Median Lethal Concentration |
| | LD50 | Lethal Dose, 50% / Median Lethal Dose |
| | mg/m ³ | Milligrams per Cubic Metre |
| | OEL | Occupational Exposure Limit |
| | pH | relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline). |
| | ppm | Parts Per Million |
| | STEL | Short-Term Exposure Limit |
| | STOT-RE | Specific target organ toxicity (repeated exposure) |
| | STOT-SE | Specific target organ toxicity (single exposure) |
| | SUSMP | Standard for the Uniform Scheduling of Medicines and Poisons |
| | SWA | Safe Work Australia |
| | TLV | Threshold Limit Value |
| | TWA | Time Weighted Average |

Report status This document has been compiled by RMT on behalf of the manufacturer, importer or supplier of the product and serves as their Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer, importer or supplier 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, importer or supplier.

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Prepared by Risk Management Technologies
5 Ventnor Ave, West Perth
Western Australia 6005
Phone: +61 8 9322 1711
Fax: +61 8 9322 1794
Email: info@rmt.com.au
Web: www.rmt.com.au

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