

## MATERIAL SAFETY DATA SHEET



### CARBON BLACK

*This material is hazardous according to criteria of NOHSC.*

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#### 1. IDENTIFICATION OF THE SUBSTANCE / MATERIAL AND COMPANY / SUPPLIER

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<b>Product Name</b>	Carbon Black Includes all N100, N200, N300, N500, N600, N700 and Platinum series carbon blacks as manufactured by Continental Carbon Australia Pty Ltd.	
<b>Other Names</b>	Continex Carbon Black, Oil Furnace Carbon Black	
<b>Recommended Use</b>	Reinforcing filler in rubber products, pigment in polymers and printing inks.	
<b>Supplier Name</b>	Continental Carbon Australia Pty Ltd	
<b>Street Address</b>	Sir Joseph Banks Drive Kurnell NSW 2231 AUSTRALIA	
<b>Telephone Number</b>	+61 2 9668 9177	(Monday to Friday 8.30am to 4.30pm)
<b>Fax Number</b>	+61 2 9668 8354	
<b>Emergency Number</b>	+61 2 9668 9010	(24Hrs)

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#### 2. HAZARDS IDENTIFICATION

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**Hazard Classification** HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS

*Specified in the NOHSC List of Designated Hazardous Substances [NOHSC:10005]. Carbon black appears on this listing due to its exposure standard (as listed in the NOHSC Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003])*

**Risk Phrase(s):** R40 – Limited evidence of a carcinogenic effect

**Safety Phrase(s):** None Allocated

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#### 3. COMPOSITION / INGREDIENTS INFORMATION

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Components	Synonyms	Chemical Formula	CAS Number	Proportion
Carbon Black, amorphous	Not relevant	C	1333-86-4	>98%
Other (eg. water, ash, sulphur)	Not relevant	Not relevant	Not relevant	Up to 100%

Manufactured carbon blacks generally contain less than 0.1% of solvent extractable polycyclic aromatic hydrocarbons (PAH). Solvent extractable PAH content depends on numerous factors including, but not limited to, the manufacturing process, desired product specifications, and the analytical procedure used to measure and identify solvent extractable materials.



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## 4. FIRST AID MEASURES

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### Acute First Aid Procedures

There is no evidence to suggest that acute exposure to carbon black may result in life threatening injury or illness. Carbon black is not a respiratory irritant, as defined by the Occupational Safety and Health Administration USA (OSHA), and does not produce respiratory or dermal sensitisation. Ingestion is an unlikely method of accidental exposure. Like many dusts, inhalation may initiate a bronchial response among individuals with pre-existing lung conditions.

<b>Inhalation</b>	Take affected persons into fresh air, if necessary. Remove from exposure. Short-term exposures to elevated concentrations may produce temporary discomfort to the upper respiratory tract, which may result in coughing and wheezing.
<b>Eye</b>	Carbon black is not a chemical irritant. Treat symptomatically for mechanical irritation. Rinse eyes thoroughly with large volumes of water keeping eyelid open to remove dust. If irritation persists or symptoms develop, seek medical attention.
<b>Skin</b>	Wash hands and other exposed skin with mild soap and water (repeat washing may be necessary to remove carbon black). If symptoms develop, seek medical attention.
<b>Ingestion</b>	No adverse effects are expected from carbon black ingestion. Do not induce vomiting. If conscious, rinse mouth with water. Never give anything by mouth to an unconscious person.
<b>Note to Doctors</b>	Treat symptomatically.

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## 5. FIRE FIGHTING MEASURES

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### Suitable Extinguishing Media

Use foam, carbon dioxide (CO<sub>2</sub>), dry chemical powder or water fog. **DO NOT USE** high pressure water stream as this may spread burning powder (burning powder will float).

### Hazards from Combustion Products

Products of combustion include carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>) and oxides of sulphur.

It may not be obvious that carbon black is burning unless the material is stirred and sparks are apparent. Carbon black that has been on fire should be observed closely for at least 48 hours to ensure no smouldering material is present.

### Precautions for Fire Fighters and Special Protective Equipment

Wear full protective fire fighting gear including self-contained breathing apparatus (SCBA) for protection against possible exposure.

Closed containers exposed to fire may be cooled with water.

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## 6. ACCIDENTAL RELEASE MEASURES

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### Emergency Procedures

**NOTE – WET CARBON BLACK PRODUCES SLIPPERY WALKING SURFACES.**

Wear appropriate Personal Protective Equipment and respiratory protection. Refer Section 8.



## Methods and Materials for Containment and Clean-up Procedures

**Small spills** Should be vacuumed when possible. Dry sweeping is not recommended due to the creation of dust in the atmosphere. A vacuum equipped with HEPA (high efficiency particulate air) filtration is recommended. If necessary, light water spray will reduce dust for dry sweeping.

**Large Spills** Evaluate the possibility of recovering and reusing the material. Large spills may be shovelled into containers. If dust levels are excessive, wear respiratory protection as outlined in Section 8.

**Note** – Refer Section 13 for Disposal Information

**Environmental Precautions** Carbon black poses no significant environmental hazards. As a matter of good practice, minimise contamination of sewerage water, soil, groundwater, and storm water or any other drainage systems or bodies of water.

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## 7. HANDLING & STORAGE

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### Precautions for Safe Handling

The main hazard from this material is in the production of dust. Avoid dust exposures above the occupational exposure limit (refer Section 8).

Engineering controls should be employed which minimise the production of dust, such as dustless systems for storage, handling, use and clean up. Where possible, use of the material should be carried out in ventilated areas. If dusts do arise, then (i) mechanical ventilation should be used to ensure that exposures do not exceed the exposure standard and (ii) clean up of dusts should be facilitated with wet or dustless (vacuuming) methods (refer Section 8 for information on Personal Protective Equipment).

Fine dust may cause electrical shorts and is capable of penetrating electrical equipment unless tightly sealed.

If hot work (welding / torch cutting etc) is required, the immediate work area must be cleared of carbon black product and dust. As per Section 5, it may not be obvious that carbon black is burning unless the material is stirred and sparks are apparent. Carbon black that has been on fire should be observed closely for at least 48 hours to ensure no smouldering material is present.

### Conditions for Safe Storage

Minimal storage requirements are needed for this product, however the product should be kept dry and sealed when not in use.

Store in a dry place away from ignition sources and strong oxidisers such as chlorates, bromates and nitrates (eg. hydrogen peroxide, bromine and chromic acid).

### Confined Spaces

Before entering confined spaces containing (or previously containing) carbon black, ensure confined space entry procedures are followed and that the atmosphere has been tested to ensure adequate oxygen and safe levels of flammable / combustibles gases and potential toxic contaminants (eg. CO).



## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### National Exposure Standards

Country	Exposure Standard	Reference
Australia	3mg/m <sup>3</sup> TWA	NOHSC <i>Exposure Standards for Atmospheric Contaminants in the Occupational Environment</i> [NOHSC:1003]
New Zealand	3mg/m <sup>3</sup> TWA	Occupational Safety & Health Service & Department of Labour <i>Workplace Exposure Standards from 2002</i>
No Short Term Exposure Limit (STEL) or Peak Limitation values set for above countries.		

#### Note – Extract from NOHSC:1003

“Exposure standards represent airborne concentrations of individual chemical substances, which according to current knowledge, should neither impair the health of, nor cause undue discomfort to, nearly all workers.”

Australian exposure standards are generally expressed as a Time-Weighted Average (TWA) concentration of that substance over an eight-hour working shift, and apply to an eight-hour day, for a five-day working week over an entire working lifetime. Short Term Exposure Limits (STEL) and Peak Limitations may also be specified for short periods of exposure (such as 15 minutes).

**Biological Limit Values**            None allocated

**Engineering Controls**    Use process enclosures and/or exhaust ventilation to keep airborne dust concentrations below the occupational exposure limit.

### Personal Protective Equipment

**Respiratory**                    Approved respirators should be worn when airborne concentrations are expected to exceed occupation exposure limits. Generally an appropriate particulate respirator is suitable – however, respirator selection must be made after considering exposure level and any other contaminants in the area. Selection, use and maintenance of respiratory protection should comply with AS 1715.

**Eye Protection**            Wear safety glasses / goggles to prevent mechanical irritation / discomfort. Eye protection should comply with AS 1337. AS 1336 recommends practices for occupational eye protection.

**Skin Protection**            Carbon black dust may cause drying of the skin with repeated and prolonged contact. Skin drying may also result from frequent washing. Use of a barrier cream on exposed skin surfaces may help assist with the removal of carbon black and help to prevent from skin drying. General protective gloves may be used to protect from carbon black soiling. Wear general protective clothing to minimise skin contact. Work clothes should be washed daily.

**General Hygiene Considerations**    Wash hands and face with mild soap and water before eating and drinking.

## 9. PHYSICAL & CHEMICAL PROPERTIES

<b>Appearance</b>	Black powder or pellet	<b>Odour</b>	Odourless
<b>pH value (ASTM 1512)</b>	7 - 9 [100g/L water, 23°C]	<b>Vapour Pressure</b>	Not relevant
<b>Vapour Density</b>	Not relevant	<b>Boiling Point/Range</b>	Not relevant
<b>Melting Point/Range</b>	Not relevant	<b>Freezing Point/Range</b>	Not relevant
<b>Solubility in Water</b>	Insoluble	<b>Viscosity</b>	Not relevant
<b>Density (20°C)</b>	1.7-1.9 g/ml	<b>Volatile (by weight %)</b>	Less than 1
<b>Bulk Density</b>	Grades vary 270-520 kg/m <sup>3</sup>	<b>Decomposition Temp</b>	300°C
<b>Partition Coefficient (Octanol/water)</b>	Not relevant		



## Flammable & Explosive Properties

Flash Point	Not Applicable
Explosive Limits (furnace black dust) <sup>1</sup>	Lower: 50 g/m <sup>3</sup> Upper: Not Determined
Minimum Ignition Temperature <sup>1</sup>	>500°C (BAM Furnace) >315°C (Godberg-Greenwald Furnace)
Minimum Ignition Energy	>10 J
Auto Ignition Temperature	>140°C
Dust Explosion Class <sup>2</sup>	ST 1
Maximum Absolute Explosion Pressure <sup>1</sup>	10 bar
Maximum Rate of Pressure Rise <sup>1</sup>	30-100 bar/sec
Burn Rate <sup>2</sup>	>45 seconds (not classifiable as "Highly Flammable", or "Easily Ignitable")

<sup>1</sup> German VDI Guideline 2263, Test Methods for the Determination of the Safety Characteristics of Dusts

<sup>2</sup> German VDI Guideline 2263 and EC Directive 84/449

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## 10. STABILITY & REACTIVITY

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Stability	Stable under normal ambient conditions.
Conditions to Avoid	Prevent exposure to high temperatures and open flames.
Incompatible Materials	Strong oxidisers such as chlorates, bromates and nitrates.
Hazardous Decomposition Products	Carbon monoxide, carbon dioxide, organic products of decompositions, oxides of sulphur form if heated above decomposition temperature.
Hazardous Reactions	Polymerisation will not occur.

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## 11. TOXICOLOGICAL INFORMATION

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### Acute Toxicity

Oral	No adverse effects are expected from carbon black ingestion. <i>LD<sub>50</sub> (rat), &gt;8000 mg/kg</i>
Eye	High dust concentrations may cause mechanical irritation to eye. <i>Rabbit: non-irritative, Draize score 10-17 / 110 (100 = maximally irritating)</i>
Skin	No adverse effects expected. <i>Rabbit: non-irritative, index score 0.6/8 (4.0 = severe oedema)</i>
Inhaled	Short-term exposures to elevated concentrations may produce temporary discomfort to the upper respiratory tract, which may occur due to mechanical irritation when exposures are above the occupational exposure limit. Like many dusts, inhalation may initiate a bronchial response among individuals with pre-existing lung conditions.

**Subchronic Toxicity** Rat; inhalation; duration 90 days; NOAEL = 1.0mg/m<sup>3</sup> (respirable)  
Target Organ: lung; Effect: inflammation, hyperplasia, fibrosis

**Chronic Toxicity** Rat, oral (feeding experiments), duration 2 years; Effect: no tumours  
Mouse, oral (feeding experiments), duration 2 years; Effect: no tumours  
Mouse, dermal, duration 18 months; Effect: no skin tumours  
Rat, inhalation, duration 2 years Target organ: Lungs  
Effect: inflammation, fibrosis, tumours



**Note:** Tumours in the rat lung are considered to be related to the “particle overload phenomenon” rather than to a specific chemical effect of carbon black itself in the lung. These effects in rats have been reported in many studies on other poorly soluble inorganic particles and appear to be rat specific. Tumours have not been observed in other species (i.e. mouse and hamster) for carbon black or other poorly soluble particles under similar circumstances and study conditions.

### **Carcinogenicity**

#### **Authoritative body classification:**

In 1995 IARC concluded, “There is *inadequate evidence* in humans for the carcinogenicity of carbon black.” Based on rat inhalation studies, the IARC concluded that there is, “*sufficient evidence* in experimental animals for the carcinogenicity of carbon black”. The IARC’s overall evaluation was that, “Carbon black is *possibly carcinogenic to humans (Group 2B)*”. This conclusion was based on IARC’s guidelines which require such a classification if one species exhibits carcinogenicity in two or more studies.

In its 1987 review IARC concluded, “There is *sufficient evidence* in experimental animals for the carcinogenicity of carbon black extracts.” Carbon black extracts are classified as “*possibly carcinogenic to humans (Group 2B)*”.

Carbon black is not designated a carcinogen by the U.S. National Toxicology Program (NTP), the U.S. Occupational Safety and Health Administration (OSHA) or the European Union (EU). The American Conference of Industrial Hygienists classifies carbon black as A4, “*Not classifiable as a Human Carcinogen*”.

The Australian [NOHSC:10005 (1999)] “List of Designated Hazardous Substances” does not specify a carcinogenic classification.

### **Mutagenic effects**

In an experimental investigation, mutational changes in the *hprt* gene were reported in alveolar epithelial cells in the rat following inhalation exposure to carbon black. This observation is believed to be rat specific and a consequence of “lung overload” (see Chronic Toxicity above). This is thus considered to be a secondary geno toxic effect and thus carbon black itself would not be considered to be mutagenic.

**Reproductive effects** No effects have been reported following long- term animal studies.

### **Epidemiology**

Results of epidemiological studies of carbon black workers suggest that cumulative exposure to carbon black may result in small decrements in lung function, as measured by FEV1. A recent U.S. respiratory morbidity study suggested a 27ml decline in FEV1 from a 1mg/m<sup>3</sup> (inhalable fraction) exposure after a 40 year period. An older European investigation suggested an exposure to 1mg/m<sup>3</sup> (inhalable fraction) of carbon black over a 40-year working lifetime will result in a 48ml decline in FEV1. In contrast, normal age related decline over a similar period of time would be approximately 1200ml.

The relationship between symptoms and exposure to carbon black is less clear. In the U.S. study, 9% of the highest exposure group (in contrast to 5% of the unexposed group) reported symptoms consistent with chronic bronchitis. In the European study, methodological limitations in the administration of the questionnaire limit the drawing of definitive conclusions about symptoms. This study, however, indicated a link between carbon black and small opacities on chest films, with negligible effects on lung function.

A study of carbon black workers in the UK showed an elevated incidence of lung cancer but it was not considered to be related to carbon black.



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## 12. ECOLOGICAL INFORMATION

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### Ecotoxicity

**Aquatic Toxicity** Acute fish toxicity: LC50 (96 h) > 1000 mg/l  
Species: *Brachydanio rerio* (zebra fish), Method: OECD Guideline 203  
Acute invertebrate toxicity: EC50 (24 h) > 5600 mg/l  
Species: *Daphnia magna* (water flea), Method: OECD Guideline 202  
Acute algae toxicity: EC 50 (72 h) >10,000 mg/l  
NOEC 50 ≥10,000 mg/l  
Species: *Scenedesmus subspicatus*, Method: OECD Guideline 201  
Activated sludge: EC0 (3 h) ≥ 800 mg/l  
Method: DEV L3 (TTC test)

**Persistence/  
Degradability** No information

### Environmental Fate

**Mobility** Not soluble in water, not expected to migrate.  
**Predicted or  
Known Distribution** Not soluble in water, expected to remain on soil surface.

**Bioaccumulation  
Potential** Bioaccumulation is not expected due to physiochemical properties of the substance.

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## 13. DISPOSAL CONSIDERATIONS

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Carbon black is classified as a solid waste and is not classified as a hazardous waste under local regulations (NSW).

Waste materials, its containers and materials contaminated with the product can be disposed to landfill as commercial waste in accordance with federal, state or local regulations. Small amounts (less than 0.5 kg) can be disposed as domestic waste.

Steps should be taken to ensure carbon black waste is suitably contained to reduce dust escaping during transport and disposal.

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## 14. TRANSPORT INFORMATION

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<b>UN Number</b>	None allocated	<b>UN Proper Shipping Name</b>	None allocated
<b>Hazchem Code</b>	None allocated	<b>Class &amp; Subsidiary Risk(s)</b>	None allocated
<b>Special Precautions for User</b>	None allocated	<b>Packing Group</b>	None allocated
<b>Export Transport Information</b>	International Maritime Dangerous Goods Code – listed as “carbon black, non-activated, mineral origin”		



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## 15. REGULATORY INFORMATION

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<b>Classification</b>	This material is hazardous according to criteria of NOHSC
<b>Risk Phrase(s):</b>	R40 – Limited evidence of a carcinogenic effect
<b>Safety Phrase(s):</b>	None allocated
<b>Poisons Schedule No.</b>	None allocated
<b>Labelling</b>	Hazardous substance labelling requirements apply to this product in Australia. Refer NOHSC: 2012 <i>National Code of Practice for the Labelling of Workplace Substances</i> or local regulations for more information.

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## 16. OTHER INFORMATION

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<b>Revision Date</b>	28 September, 2005
<b>Supersedes</b>	01 July 2000
<b>Issued By</b>	This MSDS has been prepared by the SH&E Department, Continental Carbon Australia Pty Ltd. Contact: +61 2 9668 9177
<b>More Information</b>	The publication "Carbon Black Users Guide" is available from the Supplier for further information on the use and handling of carbon black.
<b>Reason for Issue</b>	5 yearly review, compliance with NOHSC:2011 (2003) <i>National Code of Practice for the Preparation of material Safety Data Sheets 2<sup>nd</sup> Edition</i> .

### Revision Information

- i. Major changes to layout to comply with NOHSC:2011's 16-header format.
- ii. Section 1 – Clarification of product name & carbon black grades manufactured by Continental Carbon Australia. Pigment & printing use of carbon black added.
- iii. Section 2 – Addition of Risk phrase R40.
- iv. Section 3 – Composition & components of carbon black clarified.
- v. Section 4 – Acute first aid measure information expanded.
- vi. Section 6 – Addition of information of carbon black slip hazard when wet. Minor changes to clean-up procedures. Emphasis now on vacuuming spills where possible and deleting reference to cleaning areas with large volumes of water. Inserted statement on environmental precautions after accidental spill.
- vii. Section 7 – Addition of statement in relation to hazard control during and after hot work.
- viii. Section 8 – Layout of exposure standards changed (although exposure standards remain unchanged). Addition of New Zealand exposure standard. Now includes a brief explanation of terminology of exposure standards. Brief editorial changes to respiratory and eye protection sections. Included information of possible risk of hands drying from prolonged exposure to carbon black and repeated washing and relevant protection measures. Also included information on general hygiene considerations.
- ix. Section 9 – Addition of pH and decomposition temperature values. Minimum Ignition Energy now >10 J (previously >1 kJ)
- x. Section 10 – Stability & reactivity information now in one section. Now includes statement on polymerisation.
- xi. Section 11 – Acute toxicity information expanded to include animal study data. Addition of sub-chronic animal study data. Changes to mutagenic effect animal study data. New section added on Epidemiology – includes epidemiological test results from US & European studies – including possible loss of lung function after prolonged exposure.
- xii. Section 12 – New section on Ecological Information included.
- xiii. Section 13 – Minor changes to disposal considerations; inclusion of NSW classification of waste & dust control considerations when disposing of carbon black waste.
- xiv. Section 14 – Addition of IMDG Code classification for export.
- xv. Section 15 – New section; duplicates statement of hazardous classification of carbon black and relevant risk phrase. Also includes statement on labelling of carbon black packages.
- xvi. Section 16 – Includes explanation of changes to MSDS and new author details.

***This MSDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since Continental Carbon Australia Pty Ltd cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, assess and control the risks arising from its use of the material.***

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**END OF MSDS**

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