Carbon Black
Material Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION

Product name: Carbon Black

2. COMPOSITION/INFORMATION ON INGREDIENTS

2.1 Component(s)
Carbon Black, amorphous (100%)
Chemical formula: C
CAS number: 1333-86-4
EINECS number: 215-609-9
EU Classification: Not Classified

3. HAZARDS IDENTIFICATION

3.1 Most Important Hazards
A black, odorless, insoluble, powder that can burn or smolder at temperatures greater than 572ºF (>300ºC). Hazardous products of decomposition can include carbon monoxide, carbon dioxide, and oxides of sulfur. May cause reversible mechanical irritation to the eyes and respiratory tract especially at concentrations above the occupational exposure limit. Some grades of carbon black are sufficiently electrically non-conductive to allow a build-up of static charge during handling. Take measures to prevent the build-up of electrostatic charge.
3.2 Product Classification
3.2.1 EU: Not defined as a dangerous substance or preparation according to Council Directive 67/548/EEC and its various amendments and adaptations.
3.2.2 WHMIS: This material is classified as D2A under Canadian Workplace Hazardous Materials Information System (WHMIS) criteria.
3.2.3 OSHA: This material is classified as hazardous under OSHA regulations.
3.3 Routes of Exposure
Inhalation, Eye, Skin
3.4 Potential Health Effects
3.4.1 Inhalation:
Temporary discomfort to upper respiratory tract may occur due to mechanical irritation when exposures are well above the occupational exposure limit. Longterm exposure below the current occupational exposure limit of 3.5 mg/m3 may result in a small loss in one aspect of lung function (FEV1).
3.4.2 Acute Ingestion:
No evidence of adverse effects from available data.
3.4.3 Acute eye:
High dust concentrations may cause mechanical irritation to eye.
3.4.4 Acute skin:
May cause mechanical irritation, soiling, and skin drying.

3.4.5 Sensitization
No cases of sensitization in humans have been reported
3.4.6 Carcinogenicity
IARC listed; Group 2B (possibly carcinogenic to humans). Not listed as a carcinogen by NTP, ACGIH, OSHA or the European Union.
There are no known human carcinogenic effects related to the PAH content of carbon blacks. Recent research has shown that the PAH content of carbon blacks is not released in biological fluids and thus not available for biological activity.
3.5 Potential Environmental Effects
No significant environmental hazards are associated with carbon black release to the environment. Carbon black is not soluble in water. See Section 12.

4. FIRST-AID MEASURES
4.1 First aid procedures
4.1.1 Inhalation - Take affected persons into fresh air. - If necessary, restore normal breathing through standard first aid measures.
4.1.2 Skin – Wash with mild soap and water.
4.1.3 Eye - Rinse eyes thoroughly with large volumes of water keeping eyelid open. If symptoms develop, seek medical attention.
4.1.4 Ingestion - Do not induce vomiting. If conscious, give several glasses of water. Never give anything by mouth to an unconscious person.
4.2 Note to physicians
Treat symptomatically.

5. FIRE-FIGHTING MEASURES
5.1 Extinguishing Media
Use foam, carbon dioxide (CO2), dry chemical, or water fog. DO NOT USE high pressure water stream as this may spread burning powder (burning powder will float).
5.2 Special Exposure Hazards
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 smoldering material is present.
Products of combustion include carbon monoxide (CO), carbon dioxide (CO2), and oxides of sulfur.
5.3 Protection of Firefighters
Wear full protective fire fighting gear including self-contained breathing apparatus

6. ACCIDENTAL RELEASE MEASURES
NOTE: Wet carbon black produces slippery walking surfaces.
6.1 Personal Precautions
Wear appropriate personal protective equipment and respiratory protection. See Section 8.
6.2 Environmental Precautions

Carbon black poses no significant environmental hazards. As a matter of good practice, minimize contamination of sewage water, soil, groundwater, drainage systems, or bodies of water.
6.3 Methods for Cleaning Up
Small spills should be vacuumed when possible. Dry sweeping is not recommended. 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 may be shoveled into containers. See Section 13.
6.4 Carbon black is not a hazardous substance under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, 40 CFR 302), or the Clean Water Act (40 CFR 116), or a hazardous air pollutant under the Clean Air Act Amendments of 1990 (CAA 40 CFR).

7. HANDLING AND STORAGE
7.1 Handling
Avoid dust exposures above the occupational exposure limit
Use local exhaust ventilation or other appropriate engineering controls to maintain exposures below occupational exposure limit. Avoid contact with skin and eyes. If exposed, wash to avoid mechanical irritation and soiling.
Dust may cause electrical shorts if capable of penetrating electrical equipment. Ensure equipment is tightly sealed.
If hot work (welding, torch cutting, etc.) is required the immediate work area must be cleared of carbon black product and dust.
Some grades of carbon black are sufficiently electrically non-conductive and may allow a build-up of static charge during handling. Take measures to prevent the build up of electrostatic charge, such as ensuring all equipment is electrically grounded/earthed.
7.2 Storage
Store in a dry place away from ignition sources and strong oxidizers.
Before entering closed vessels and confined spaces containing carbon black test for adequate oxygen, flammable gases and potential toxic air contaminants (e.g., CO). Follow safe practices when entering confined spaces.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION
8.1 Exposure Limit Values

Country	**Occupational Exposure Limit, mg/m3**
Australia	3.0 TWA
Canada	3.5 TWA
France	3.5 TWA
Germany - MAK	
TRGS 900	
	1.0 TWA (respirable)A
	4.0 TWA (inhalable)A
	3.0 TWA (respirable)B
	6.0 TWA (respirable)C

10.0 TWA (inhalable)D
Italy 3.5 TWA
Korea 3.5 TWA
Spain 3.5 TWA
United Kingdom – OES
STEL
3.5 TWA (inhalable)
7.0, 10 minutes
United States - OSHA-PEL
ACGIH-TLV
NIOSH -REL
3.5 TWA
3.5 TWA
3.5 TWA (see Section 11)
TWA = 8-hour time-weighted-average, except as noted. MAK = Maximale Arbeitsplatz-Konzentration
(maximum workplace concentration) (advisory). TRGS = Technische Regeln fur Gefahrstoffe (regulatory
limits). OES = occupational exposure standard. STEL = short-term exposure limit. OSHA-PEL =
Occupational Safety and Health Administration - permissible exposure limit. American Conference of
Governmental Industrial Hygienists–Threshold Limit Value. NIOSH-REL = National Institute of
Occupational Safety and Health - recommended exposure limit.
A annual average. B applies to all activities except those exempted, consult regulatory agency.
C applies to certain exempt industries, consult regulatory authority. D effective April 2004, consult
regulatory agency.
8.2 Engineering Controls
Use process enclosures and/or exhaust ventilation to keep airborne dust concentrations below the occupational exposure limit.
8.3 Personal Protective Equipment
8.3.1 Respiratory
Approved respirators should be used where airborne concentrations are expected to exceed occupational exposure limits.
8.3.2 Hand Protection
Wash hands and other exposed skin with mild soap. Use of a barrier cream may help to prevent skin drying. General protective gloves may be used to protect hands from carbon black soiling.
8.3.3 Eye Protection
Wear safety glasses or goggles.
8.3.4 Skin Protection
Wear general protective clothing to minimize skin contact. Work clothes should NOT be taken home and should be washed daily.

8.3.5 General Hygiene Considerations
Emergency eyewash and safety shower should be in close proximity. Wash hands and face thoroughly with mild soap before eating and drinking.

9. PHYSICAL AND CHEMICAL PROPERTIES
9.1 Appearance: powder or pellet
9.2 Color: black
9.3 Odor odorless
9.4 Odor threshold: not applicable
9.5 Melting point/range not applicable
9.6 Boiling point/range not applicable
9.7 Vapor pressure not applicable
9.8 Evaporation rate not applicable
9.9 Density: (20ºC) 1.7 – 1.9 g/ml
9.1010 Bulk density:
Pellets 630-680 kg/m3
Powder (fluffy) 250-380 kg/m3
9.11 Solubility (in Water): insoluble
9.12 pH value: N/A
9.13 Partition coefficient (n-octanol/water): not applicable
9.14 Viscosity: not applicable
9.15 Flammable and Explosive Properties
Flashpoint not applicable
Flammability Classification (as defined by OSHA 1910.1200): not applicable
Explosive Limits (dust):
Furnace black: (VDI 2263)
Lower : 50 g/m3
Upper: not determined
Thermal black: (VDI 2263)
Lower: 375 g/m3
Upper: not determined
Dust Explosion Class (VDI 2263, EC 84/449) ST 1
Maximum Absolute Explosion Pressure 6.7 bar @ 30 kJ
Maximum Rate of Pressure Rise1 23 bar m/s
Spontaneous Ignition (Autoignition) >284ºF (>140ºC)
Minimum Ignition Temperature
Thermal Black, ASTM E1491 >14720F (>8000C)
Furnace Black, Method: BAM Furnace >932ºF (>500ºC)
Furnace Black, Godberg-Greenwald Furnace >600ºF (>315ºC)
Minimum Ignition Energy >5 J
Burn Rate (VDI 2263, EC 84/449) >45 seconds
(not classifiable as “Highly Flammable”, or “Easily Ignitable”)
Ignition Energy (VDI 2263)
Furnace black: >1 kJ
Thermal black: >20 kJ

10. STABILITY AND REACTIVITY

Stability: stable under normal ambient conditions
Conditions to avoid: prevent exposure to high temperatures >572ºF (>300ºC) and open flames.
Materials to avoid: strong oxidizers such as chlorates, bromates, and nitrates.
Hazardous decomposition products: carbon monoxide, carbon dioxide, organic products of decomposition, oxides of sulfur formed if heated above decomposition temperature.
Hazardous polymerization: Will not occur

11. TOXICOLOGICAL INFORMATION

11.1 Acute toxicity:
Acute oral toxicity: LD50 (rat), > 8000 mg/kg
Primary skin irritation:
rabbit: non-irritative, index score 0.6/8 (4.0 = severe edema)
Primary eye irritation
rabbit: non-irritative, Draize score 10-17/110
(100 = maximally irritating)
11.2 Subchronic toxicity:
Rat, inhalation, duration 90 days, NOAEL = 1.0 mg/m3 (respirable)
Target organ: lungs; inflammation, hyperplasia, fibrosis
11.3 Chronic toxicity:
Rat,oral, duration 2 years
Effect: no tumors
Mouse, oral,duration 2 years
Effect: no tumors
Mouse, dermal, duration 18 months
Effect: no skin tumors
Rat, inhalation, duration 2 years
Target organ: lungs
Effect: inflammation, fibrosis, tumors
Note: Tumors 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 inorganic insoluble particles and appear to be rat specific. Tumors have not been observed in other species (i.e., mouse and hamster) for carbon black or other insoluble particles under similar circumstances and study conditions
11.4 Carcinogenicity
In 1995 IARC concluded, "There is *inadequate evidence* in humans for the carcinogenicity of carbon black." Based on rat inhalation studies IARC concluded that there is, s*ufficient evidence* in experimental animals for the carcinogenicity of carbon black," IARC's overall evaluation in 1995 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 Governmental Industrial Hygienists classifies carbon black as A4, *Not Classifiable as a Human Carcinogen.*
The U.S. National Institute of Occupational Safety and Health (NIOSH) 1978 criteria document on carbon black recommends that only carbon blacks with PAH levels greater than 0.1% require the measurement of PAHs in air. As some PAHs are possible human carcinogens, NIOSH recommends an exposure limit of 0.1 mg/m3 for PAHs in air, measured as the cyclohexane-extractable fraction.
11.5 Sensitization: no animal data available.
11.6 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" which led to chronic inflammation and release of oxygen species. (see Chronic toxicity above). This is thus considered to be a secondary genotoxic effect and thus carbon black itself would not be considered to be mutagenic.
11.7 Reproductive effects:
No effects have been reported in long-term animal studies.
11.8 Epidemiology:

Results of epidemiological studies of carbon black production 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 27 ml decline in FEV1 from a 1 mg/m3 (inhalable fraction) exposure over a 40-year period. An older European investigation suggested an exposure to 1 mg/m3 (inhalable fraction) of carbon black over a 40-year working-lifetime will result in a 48 ml decline in FEV1. In contrast, normal age related decline over a similar period of time would be approximately 1200 ml. 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.

12. ECOLOGICAL DATA
12.1 Aquatic toxicity:
12.1.1 Acute fish toxicity: LC50 (96 h) > 1000mg/l,

Species: *Brachydanio rerio* (zebrafish),
Method: OECD Guideline 203
12.1.2 Acute invertebrate toxicity
EC50 (24 h) > 5600 mg/l.
Species: *Daphnia magna* (waterflea),
Method: OECD Guideline 202
12.1.3 Acute algae toxicity:
EC 50 (72 h) >10,000 mg/l
NOEC 50 >10,000 mg/l
Species: *Scenedesmus subspicatus*,
Method: OECD Guideline 201
12.1.4 Activated sludge,
EC0 (3 h) >= 800 mg/l.
Method: DEV L3 (TTC test)
12.2 Environmental fate:

12.2.1 Mobility
Not soluble in water. Not expected to migrate.
12.2.2 Known or predicted distribution
Not soluble in water. Expected to remain on soil surface.
12.3 Bioaccumulation Potential
Bioaccumulation is not expected due to physicochemical properties of the substance.

13. DISPOSAL CONSIDERATIONS
13.1 Product can be burned in suitable incineration plants or disposed of in a suitable landfill in accordance with the regulations issued by the appropriate federal, provincial, state and local authorities.
EU: EU Waste Code No. 61303 per Council Directive 75/422/EEC
U.S.: Not a hazardous waste under U.S. RCRA, 40 CFR 261.
Canada: Not a hazardous waste under provincial regulations.
13.2 Container/Packaging. Return reusable containers to manufacturer. Paper bags may be incinerated, or recycled, or disposed of in an appropriate landfill in accordance with national and local laws.

14. TRANSPORT INFORMATION
Carbon black is not restricted for transport by the following regulations:
Canadian Transport of Dangerous Goods (TDG)
European Carriage of Dangerous Goods by Rail (RID), by Road (ADR), or on the Rhine (ADNR)
International Air Transport Association (IATA)
Note: listed as “carbon black, non-activated, mineral origin
International Civil Air Organization-Technical Instructions (ICAO-TI)
Note: listed as “carbon black, non-activated, mineral origin”
International Maritime Dangerous Goods Code (IMDG)
Note: listed as “carbon black, non-activated, mineral origin”

15. REGULATORY INFORMATION

15.1 European Union – Label Information

Carbon black is not defined as a dangerous substance or preparation according to Council Directive 67/548/EEC and its various amendments and adaptations.

Symbol – none required.

Risk and Safety Phrases:

S22 Do not breathe dust.

S33 Take precautionary measures against static discharge.

[S33 may not be applicable to all grades of carbon black.]

15.2 Canada

Workplace Hazardous Material Information System (WHMIS), Classification D2A

Statement of Equivalence

"This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and MSDS contains all the information required by the Controlled Products Regulations."

Ingredients Disclosure List

Contains carbon black. See Section 2.

15.3 United .States

Carbon black is on the Chemical Hazard Information Profile (CHIP) list under TSCA.

Superfund Amendments and Reauthorization Act (SARA) Title III

Section 313 Toxic Substances: Does not contain any components subject to this section.

Toxic Release Inventory (TRI)

Under EPA's Toxics Release Inventory (TRI) program the reporting threshold for 21 Polycyclic Aromatic Compounds (PACs) has been lowered to 100 pounds per year manufactured, processed, or otherwise used. (64 CFR 58666, Oct. 29, 1999) The 100 pounds/yr applies to the cumulative total of 21 specific PACs. Carbon black may contain certain of these PACs and the user is advised to evaluate their own TRI reporting responsibilities.

California Safe Drinking Water and Toxics Enforcement Act of 1986 (Proposition 65): "Carbon black (airborne, unbound particles of respirable size)" is a California Proposition 65 listed substance.

15.4 Inventory Status

All components either are listed on or exempt from the following inventories:

Europe (EU): EINECS (European Inventory of Existing Commercial Chemical Substances), EINECS-RN: 215-609-9.

Australia: AICS (Australian Inventory of Chemical Substances)

Canada: CEPA (Canadian Environmental Protection Act), domestic substance list (DSL).

China: Inventory of Existing Chemical Substances

Japan: MITI (Ministry of International Trade and Industry) List of Existing Chemicals Substances. 10-3074/5-3328 and 10-3073/5-5222 (Section-Structure No./Class Reference No.)

Korea: TCC-ECL (Toxic Chemical Control Law Existing Chemical List) KE-

04882
United States: SARA (Super Fund Amendments and Reauthorization Act), Sections 311/312 apply if carbon black is present at any one time in amounts equal to or greater than 10,000 pounds. Under Section 311/312 – MSDS requirements, carbon black is determined to be hazardous according to the following EPA hazard categories:
Immediate health hazard: No
Delayed (chronic) health hazard: Yes
Sudden release of pressure hazard: No
Reactive hazard: No

16. OTHER INFORMATION

16.1 Polycyclic Aromatic Hydrocarbon (PAH) Content
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.
Questions concerning PAH content of carbon black and analytical procedures should be addressed to your carbon black supplier.
16.2 National Fire Protection Association (NFPA) Rating:
Health: 1
Flammability: 1
Reactivity: 0
0 = minimal, 1 = slight, 2 = moderate, 3 = serious, 4 = severe
16.3 Hazardous Materials Identification System® (HMIS®) Rating:
Health: 1* (*designates chronic hazard)
Flammability: 1
Physical Hazard: 0
0 = minimal, 1 = slight, 2 = moderate, 3 = serious, 4 = severe
HMIS® is a registered trademark of the National Paint and Coatings Association
16.4 Revision Indicator: A parenthetical asterisk (*) designates a significant change from the
last revision.
