CABOT Material Safety Data Sheet

(MSDS has been prepared in accordance with
ISO 11014-1/ ANSI standard Z400.1-1998, 93/112/EC.)

*Section 1 - Product and Company Identification

Trade Name: BLACK PEARLS®*, ELFTEX®, MOGUL®, MONARCH®, REGAL®, STERLING®, VULCAN®, CSX®, CRX®, IRX®, carbon black grade series. The foregoing are registered trade names of the Cabot Corporation. *Excludes Oil Pelleted and FDA indirect food contact grades.

Product Code:	**Product Type:**	**Date Revised:** Sept, 1999
Not Applicable	Carbon Black	**Previous:** June, 1996

Manufacturer:	**Tel #:** (978) 670-6959	
Cabot Corporation	**Emergency #:** Chemtrec: (USA)	(800) 424-9300 or
157 Concord Road		(703) 527-3887
Billerica, MA 01821	Canutec: (Canada)	(613) 996-6666

Prepared by: Jeffrey Foy, Ph.D., Toxicologist

Product Chemical Name: Carbon Black

Chemical Family: Carbon Black

Product Trivial Name: Furnace Black

Chemical Formula: C **Molecular Weight:** 12

*Section 2 - Composition / Information on Hazardous Ingredients

Substance Name	C.A.S. No.	EINECS No.	% by Weight
Carbon Black, Amorphous	1333-86-4	215-609-9	100%

This material is classified as hazardous under OSHA regulations.

*Section 3 - Hazards Identification

Emergency Overview - A black, odorless powder which can burn or smolder at temperatures greater than 572°F(>300°C). Hazardous products of decomposition can include carbon monoxide, carbon dioxide and oxides of sulfur. May cause mechanical irritation to the eyes and temporary discomfort to the respiratory tract at concentrations above the occupational exposure limit.

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.

Potential Health Effects

Routes of Exposure: Skin, Eye, Inhalation.

Inhalation: Temporary discomfort to upper respiratory tract may occur due to mechanical irritation when exposures are well above the occupational exposure limit.

Ingestion: No evidence of adverse effects from available data.

Eyes: High dust concentrations may cause mechanical irritation to eye.

Skin: No adverse effects expected.

Sensitization: No cases of sensitization in humans have been reported.

Chronic: IARC listed; Group 2B substance (possibly carcinogenic to humans). See Section 11. There are no known human carcinogenic effects related to the polycyclic aromatic hydrocarbons (PAH) content of carbon blacks.

Medical Conditions Aggravated: None known

*Section 4 - First Aid Measures

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If symptoms develop, seek medical attention.

Skin: Wash skin with mild soap and water. If symptoms develop, seek medical attention.

Ingestion: Do not induce vomiting. If conscious and alert, rinse mouth with water. Never give anything by mouth to an unconscious person.

Eyes: Rinse eyes thoroughly with plenty of water keeping eyelid open. If symptoms develop, seek medical attention.

*Section 5 - Fire Fighting Measures

Suitable Extinguishing Media: Use foam, carbon dioxide (CO_2), dry chemical, or water spray. A fog spray is recommended if water is used.

Unsuitable Extinguishing Media: Avoid high pressure water stream as this may spread burning powder (burning powder will float).

Lower Explosive Limit (dust) 50 g/m³	**Upper Explosive Limit** Not determined	**Flash Point** Not applicable
Flammability Classification Not applicable	**Spontaneous Ignition (Transport)** >284°F (>140°C)	**Minimum Ignition Temperature** VDI 2263 (BAM Furnace)>932°F(>500°C) Godberg-Greenwald Furnace >600°F(>315°C)
Dust Explosion Class ST 1	**Minimum Ignition Energy** >10 J	**Maximum Absolute Explosion Pressure** 10 bar
Ignition Energy > 1kJ	**Burn Velocity** >45 seconds (not classifiable as "Highly Flammable", or "Easily Ignitable")	**Maximum Rate of Pressure Rise** 30-100 bar/sec.

Combustion Hazards: Products of combustion include carbon monoxide (CO), carbon dioxide (CO_2), and oxides of sulfur.

Protective Equipment: Wear full protective fire fighting gear including self-contained breathing apparatus (SCBA).

Unusual Fire 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.

Sensitivity to Impact: Not applicable.

Static Charge Effects: Some grades of carbon black are sufficiently electrically non-conductive to allow a build-up of a static charge during handling.

*Section 6 - Accidental Release Measures

Note: Wet carbon black produces dangerously slippery walking surfaces.

Spill Cleanup Measures: 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.

Wear appropriate personal protective equipment and respiratory protection. See Section 8.

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.

*Section 7 - Handling and Storage

Handling Precautions: Avoid dust exposures above the occupational exposure limit. Avoid contact with skin and eyes. Wash exposed skin daily. Use local exhaust ventilation to control exposures to below occupational exposure limit. 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.

Storage Precautions: Store in 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 (i.e., CO). Follow safe practices when entering confined spaces.

*Section 8 - Exposure Controls / Personal Protection

Exposure guidelines:

Country	**Occupational Exposure Limit, mg/m3**
Australia	3.0 TWA
United States	
OSHA-PEL	3.5 TWA
ACGIH-TLV	3.5 TWA
NIOSH-REL	3.5 TWA (see Section 11)
Germany	
MAKs	1.5 respirable TWA*
	4.0 inhalable TWA*
TRGS 900	6.0 respirable TWA*
Canada	3.5 TWA
United Kingdom	3.5 TWA
	7.0 STEL, 10 minutes
France	3.5 TWA
Sweden	3.0 TWA
Korea	3.5 TWA

*For particulates not otherwise classified (PNOC).

Respiratory Protection

An approved air-purifying respirator (APR) for particulates may be permissible where airborne concentrations are expected to exceed occupational exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air supplied respirator if there is any potential for uncontrolled release, exposure levels are not known, or any circumstances where air-purifying respirators may not provide adequate protection. Use of respirators must include a complete respiratory protection program in accordance with national standards and current best practices.

The following agencies/organizations approve respirators and/or criteria for respirator programs:

U.S.:	NIOSH approval under 42 CFR 84 required.
	OSHA (29 CFR 1910.134)
	ANSI Z88.2-1992 (Respiratory Protection)
EU:	CR592 Guidelines for the Selection and Use of Respiratory Protection.
Germany:	DIN/EN 143 Respiratory Protective Devices for Dusty Materials.
UK:	BS 4275 Recommendations for the Selection, Use and Maintenance of Respiratory Protective Equipment.
	HSE Guidance Note HS(G)53 Respiratory Protective Equipment.

*Section 8 - Exposure Controls / Personal Protection

Personal Protective Equipment (PPE)

Gloves: No special PPE required. Gloves may be used to protect hands from carbon black soiling.
Protective Clothing: Work clothes should **not** be taken home and should be washed daily.
Eye/Face Protection: Eye protection recommended as a matter of good industrial safety practice.
General Hygiene Considerations: Wash hands and face thoroughly with mild soap before eating and drinking. Frequent skin washing may dry skin. Application of a skin lotion is recommended.

Engineering Controls

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

ACGIH: American Conference of Governmental Industrial Hygienists
NIOSH: National Institute for Occupational Safety and Health
OSHA: Occupational Health and Safety and Administration
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
TLV: Threshold Limit Value
TWA: Time Weighted Average
MAK: Maximal Arbeitsplatzkonzentration
OES: Occupational Exposure Standard
TRGS: Technische Regeln für Gefahrstoffe (Technical rule for Hazardous Materials).

*Section 9 - Physical and Chemical Properties

Physical State Powder or Pellet	**Color** Black	**Odor** Odorless
Vapor Pressure Not applicable	**pH** >7 [50 g/l water, 68°F (20°C)] (oxidized grades** pH 2-4)	**Boiling Point** Not applicable
Evaporation Rate Not applicable	**Melting/Freezing Point** Not applicable	**Viscosity** Not applicable
Solubility in Water Insoluble in water	**Partition coefficient** Not applicable	**Molecular weight (as carbon)** 12
Bulk Density 20-550 kg/m^3	**Percent Volatile** <2.5% when heated to 950°C. Oxidized grades** range from 2.0 - 11.0%	**Density (20°C)** 1.7-1.9 g/cm^3

****BLACK PEARLS®/MOGUL®L, BLACK PEARLS®/MONARCH® 1000, 1300, 1400, REGAL® 400/400R**

*Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal ambient conditions. Decomposition: >572°F (>300°C)

Conditions to Avoid: Prevent exposure to high temperatures >572°F (>300°C) and open flames.

Materials to Avoid: Strong oxidizers such as chlorates, bromates, and nitrates.

Reactivity: May react exothermically with strong oxidizers.

Hazardous Decomposition: Carbon monoxide, carbon dioxide, organic products of decomposition, oxides or sulfur (sulfoxides) form if heated above decomposition temperature.

Hazardous polymerization: Will not occur.

*Section 11- Toxicological Information

Acute Toxicity:

Acute Oral:	LD_{50} (rat), >8000 mg/kg
Acute Eye:	(rabbit), non-irritative, Draize score 10-17/110 (100 maximally irritating)
Acute Skin:	(rabbit), non-irritative, index score 0.6/8 (4.0=severe edema)
Sensitization:	No animal data available.

*Section 11- Toxicological Information	
Subchronic Toxicity:	Rat, inhalation, duration 90 days. Target organ: lungs; inflammation, hyperplasia, fibrosis. NOEL = 1.1 mg/m3
Epidemiology:	Results of epidemiological studies of carbon black production workers have been inconsistent and difficult to interpret. Studies evaluating statistical associations of carbon black production work with symptoms of cough and sputum have been inconsistent. Based on a comprehensive independent review of a major epidemiological study, the validity of a relationship between carbon black exposure and symptoms of cough and sputum can not be supported by the available data. Changes in some lung function tests and increased average number of opacities (shadows) on chest x-ray examinations have also been suggested, but their clinical significance is uncertain.
Chronic Inhalation:	Rat, inhalation, duration: 2 years Target organ: Lungs Effect: inflammation, fibrosis, tumors Note: Tumors in the rat lung are related to the fine particle overload phenomenon rather than to a specific chemical effect of the dust particles in the lung. These effects in rats have been reported in studies on other inorganic insoluble particles and appear to be species specific. Tumors have not been observed in other species (i.e., mouse and hamster) for carbon black under similar circumstances and study conditions.
Chronic Ingestion:	Rat, oral (feeding experiments), duration: 2 years, no tumors Mouse, oral (feeding experiments), duration: 2 years, no tumors
Chronic Skin:	Mouse, dermal, duration: 12-18 months, no skin tumors
Mutagenicity:	Because carbon black is not soluble or dispersible in aqueous systems testing in bacterial and other in-vitro systems should be conducted using DMSO. A DMSO suspension of carbon black produced negative results in an Ames test. Organic solvent extracts of carbon black can however contain traces of polycylic aromatic hydrocarbons (PAH). These can cause negative and positive test results in different in-vitro test systems. In an experimental investigation, mutational changes in the hptv 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).
Reproductive Effects:	No effects have been reported in reproductive organs in long term animal studies.

Authoritative body classification: In 1995 International Agency for Research on Cancer (IARC) concluded, "There is *inadequate evidence* in humans for the carcinogenicity of carbon black." Based on rat inhalation studies IARC concluded that there is, "*sufficient 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) or the U.S. Occupational Safety and Health Administration (OSHA).

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.

*Section 12 - Ecological Data

Aquatic toxicity

Acute fish toxicity:
LC_{50} (96hr) > 100 mg/l, *Brachydanio rerio* (zebrafish), (OECD Guideline 203).
Acute water flea toxicity: EC_{50} (24 hr)> 5600 mg/l.
Daphnia magna (waterflea), (OECD Guideline 202).
Acute algae toxicity *(Scenedesmus subspicatus)* (OECD Guideline 201):
EC_{50} (72hr) > 10,000 mg/L
NOEC ≥ 10,000 mg/L

Behavior in water treatment plants

Activated sludge, EC_0 (3hr) >=800 mg/l.
DEV L3 (TTC test)

Mobility	**Persistence/Degradability**
Not soluble in water	Not expected to degrade

Bio-Accumulation

Bioaccumulation: Potential bioaccumulation is not expected because of physio-chemical properties of the substance.

*Section 13 - Disposal Considerations

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: Waste code (EU): See industry specific waste code. See European Waste Catalogue (75/442/EEC).

U.S.: Not a hazardous waste under U.S. (RCRA) Resource Conservation and Recovery Act, 40 CFR 261.

Canada: Not a hazardous waste under provincial regulations.

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.

*Section 14 - Transport Information

Carbon black is not classified as a hazardous material by the following country regulations/agencies:
Canadian Transport of Dangerous Goods Regulation
European Transport of Dangerous Goods Regulations
GGVS, GGVE, RID, ADR, IMDG Code, ICAO-TI
United Nations (no UN number)
U.S. Department of Transportation

UN Number	**UN Proper Shipping Name**	**UN Shipping Class**
None	Not Classified	Not Classified
UN Packing Group	**International Transportation Identification**	**U.S. Rail Regulations**
Not classified	"Carbon black, non-activated, mineral origin". Not dangerous according to IMDG-Code Not dangerous according to ICAO-TI	Not Classified

*Section 15 - Regulatory Information

National Registries - Carbon black, CAS number 1333-86-4, appears on the following inventories:

United States: TSCA (Toxic Substance Control Act inventory). Carbon Black is a Chemical Hazard Information Profile (CHIP) Chemical under TSCA.
Europe (EU): EINECS (European Inventory of Existing Commercial Chemical Substances), EINECS-RN: 215-609-9.
Canada: CEPA (Canadian Environmental Protection Act), Domestic Substance List (DSL).
Japan: MITI (Ministry of International Trade and Industry) List of Existing Chemical 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
Australia: AICS (Australian Inventory of Chemical Substances)

Europe (EU): Carbon black is not defined as a dangerous substance regarding EU Directive 67/548/EEC and it's various amendments and adaptations.
Canada: WHMIS, class D2A.

United States:

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, 40 CFR 302): Carbon black is not a hazardous substance under the CERCLA.
Clean Water Act (40 CFR 116): not listed
Clean Air Act Amendments of 1990 (CAA 40 CFR): Not listed. The product is not made with nor does it contain any Class 1 or Class 2 ozone depleting substances as defined under the 1990 amendments to the act.

CONEG Legislation - The products referenced in Section 1 meet the Coalition of Northeast Governors (CONEG) Source Reduction Council limits for the sum of the levels of Lead, Cadmium, Mercury and Hexavalent Chromium of less than 100 parts per million by weight.

U.S. State Regulations:
California: Carbon black is not a Proposition 65 listed chemical.
Louisiana: Right to know legislation requires inventory reporting through Community Right-to-Know when the quantity of Carbon black exceeds 500 pounds on any given day. Spills or releases beyond the site of the facility of greater than 5,000 pounds are required to be immediately reported to the state Emergency Response Commission via the Office of the State Police, Transportation and Environmental Safety Section, Hazardous Material Hotline, (504) 925-6596 (collect calls accepted 24 hours a day).
New Jersey: Carbon Black, C.A.S. 1333-86-4

U.S. SARA Title III - Superfund Amendments and Reauthorization Act (SARA)

Section 302: Does not contain any constituents that are identified as extremely hazardous.
Section 311/312: Carbon black is subject to EPA's "Hazardous Chemical Reporting and Community Right-to-Know". Tier I and/or Tier II forms need to be submitted if carbon black is present at the facility in quantities greater than 10,000 pounds at any one time.
Section 311/312 - MSDS Requirements - Our evaluation has found this material to be hazardous and should be reported under the following EPA hazard categories:
-- Immediate health hazard
XX Delayed (chronic) health hazard
-- Fire hazard
-- Sudden release of pressure hazard
-- Reactive hazard

Section 313: Does not contain any of the substances identified under Section 313 as toxic chemicals in Excess of the *de minimis* concentrations necessary to be subject to this rule.

Food Contact Regulations: Carbon black is permitted for indirect contact with food and drugs when used as a filler in rubber articles intended for repeat use under 21 CFR (Code of Federal Regulations) 177.2600.

*Section 15 - Regulatory Information

Limitations:

- Total carbon black (channel process and furnace process) in the rubber may not exceed 50% by weight of the rubber products. Cabot carbon blacks are furnace process blacks.
- Furnace process black content may not exceed 10% by weight of rubber product intended for use in contact with milk or edible oils.

*Section 16 - Other Information

HMIS/NFPA Rating
0/0 - health
1/1 - flammability
0/0 - reactivity

HMIS Index: *0 - minimal*
1 - slight
2 - moderate
3 - serious
4 - severe

Carbon black extracts:

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.

General: The carbon black industry continues to sponsor research designed to identify adverse health effects from long term exposure to carbon black. This MSDS will be updated as new safety and health information may become available.

Revision Indicator: An asterisk (*) indicates revisions from the last version.

Disclaimer - *The data and information presented herein corresponds to the present state of our knowledge and experience and is intended to describe our product with respect to possible occupational safety and health concerns. The user of this product has sole responsibility to determine the suitability of the product for any use and manner of use intended, and for determining the regulations applicable to such use in the relevant jurisdiction. This MSDS is updated on a periodic basis in accordance with applicable health and safety standards.*

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