

## GPS Safety Summary

**Product Name: Carbon Black**

### 1. General Statement

Carbon black is a material produced by the incomplete combustion of heavy petroleum products such as fluid catalytic cracking tar, coal tar, ethylene cracking tar. Carbon black is a form of procrystalline carbon that has a high surface-area-to-volume-ratio, albeit lower than that of activated carbon. It is dissimilar to soot in its much higher surface-area-to-volume ratio and significantly lower (negligible and non-bioavailable) polycyclic aromatic hydrocarbon (PAH) content. However, carbon black is widely used as a model compound for diesel soot for diesel oxidation experiments. Carbon black is mainly used as a reinforcing filler in tires and other rubber products. In plastics, paints, and inks, carbon black is used as a colour pigment. It is used in some places, such as the EU, as a food colourant if produced from vegetable matter. The current International Agency for Research on Cancer (IARC) evaluation is that, "Carbon black is possibly carcinogenic to humans (Group 2B)". Short-term exposure to high concentrations of carbon black dust may produce discomfort to the upper respiratory tract, through mechanical irritation.

### 2. Chemical Identity

Name:	Carbon black, Amorphous (>98%)
Brand names:	Carbon
Chemical name (IUPAC):	Carbon
CAS number(s):	1333-86-4
ES number:	215-609-9
Molecular formula:	C

### 3. Use and applications

Carbon black is mainly used to strengthen rubber in tires, but can also act as a pigment, UV stabilizer, and conductive or insulating agent in a variety of rubber, plastic, ink and coating applications. The fundamental properties of carbon black determine application performance. Carbon black is a basic material with a long history, and it has been used as a coloring agent since the days before Christ. Since carbon black has nanoparticles with various functions such as ultra-violet absorption and conductivity, it is still being applied to new fields such as electronic equipment and devices. Some applications of carbon black, which is a conventional yet new material, are shown below.

- ❖ Coloring Agent for Ink and Paints

Carbon black has higher tinting strength compared to iron black or organic pigments, and is widely used for newspaper inks, printing inks, India inks, and paints. Carbon black is also used as black pigment for inkjet ink or toners.

❖ Resin and Film Colouring Agents

Carbon black has high tinting strength and is thermally stable, and therefore it is suitable for colouring resins and films that are heat- formed. Carbon black is also excellent for absorbing ultraviolet light, providing both a superb resistance against ultraviolet rays and a colouring effect when just a small amount is mixed with resins. Carbon black is widely used for general colouring for resins and films. Resins with carbon black are used in automobile bumpers, wire coverings and steel pipe linings which require weather resistance.

❖ Electric Conductive Agent

Carbon black particles have the graphite - type crystalline structure, providing an excellent electric conductivity. Therefore, carbon black is widely used as conductive filler, being mixed in plastics, elastomer, paints, adhesives, films, and pastes. Fuel caps and fuel-introducing pipes of automobiles, for example, are required of electric conductivity for preventing static. Therefore, carbon black is used as an excellent antistatic agent.

❖ Electronic Equipment Related Material

Carbon black also provides stable resistance, and therefore is used as electronic equipment related material in various display components, magnetic recording

#### 4. Physical / Chemical properties

Property	Value
Appearance	powder or pellet
Color	black
Odor	odorless
Odor threshold	not applicable
Melting point/range	not applicable
Boiling point/range	not applicable
Vapor pressure	not applicable
Evaporation rate	not applicable
Density: (20°C)	1.7 – 1.9 g/ml
Bulk density:	Pellets
Powder (fluffy)	1.25 – 4.0 lb/ft <sup>3</sup> , 20-640 kg/m <sup>3</sup> 200-680 kg/m <sup>3</sup> 2-lbs/ft <sup>3</sup> , or 20-380 kg/m <sup>3</sup>
Solubility (in Water)	Insoluble
pH value: (ASTM 1512)	>7 [50 g/l water, 68°F (20°C)]
Partition coefficient (n-octanol/water)	not applicable
Viscosity	not applicable
Decomposition temperature	572°F (300°C)
Flammable and Explosive Properties	not applicable
Flashpoint	

Flammability Classification (as defined by OSHA 1910.1200)	not applicable
Spontaneous Ignition (Autoignition)	
Minimum Ignition Temperature (VDI 2263)	>284°F (>140°C)
BAM Furnace	
Godbert-Greenwald Furnace	>932°F (>500°C) >600°F (>315°C)
Minimum Ignition Energy	
Burn Rate (VDI 2263, EC 84/449)	

## 5. Health Effects

Exposure to CO<sub>2</sub> can produce a variety of health effects. These may include headaches, dizziness, restlessness, a tingling or pins or needles feeling, difficulty breathing, sweating, tiredness, increased heart rate, elevated blood pressure, coma, asphyxia, and convulsions

Effect Assessment	Result
Routes of Exposure	Inhalation, Eye, Skin Note: Ingestion of carbon black is not considered a likely route of exposure.
Acute Inhalation	Temporary discomfort to upper respiratory tract may occur due to mechanical irritation when exposures are well above the occupational exposure limit.
Acute Ingestion	No evidence of adverse effects from available data.
Acute eye	High dust concentrations may cause mechanical irritation to eye
Acute skin	May cause mechanical irritation, soiling, and skin drying
Sensitization	No cases of sensitization in humans have been reported.
Inhalation	Long-term exposure below the occupational exposure limit of 3.5 mg/m <sup>3</sup> (when measured as „total dust“) may result in a small loss in one aspect of lung function (FEV1) over a working lifetime.
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.

## 6. Environmental Effects

Per unit of mass, black carbon has a warming impact on climate that is 460-1,500 times stronger than CO<sub>2</sub>. When suspended in the atmosphere, black carbon contributes to warming by converting incoming solar radiation to heat. It also influences cloud formation and impacts regional circulation and rainfall patterns.

Effect Assessment	Result
warming impact	The substance is 460-1,500 times stronger than CO <sub>2</sub> .

Fate and behavior	Result
Biodegradation	
Bioaccumulation potential	
PBT/vPvB conclusion	Not relevant.

## 7. Exposure

Exposure guidelines:	The table below is a summary. Please see the specific legislation for complete information
Carbon Black, CAS RN 1333-86-4:	Argentina: 3.5 mg/m <sup>3</sup> , TWA Australia: 3.0 mg/m <sup>3</sup> , TWA inhalable Belgium: 3.6 mg/m <sup>3</sup> , TWA Brasil: 3.5 mg/m <sup>3</sup> , TWA Canada (Ontario): 3.0 mg/m <sup>3</sup> , TWA inhalable China: 4.0 mg/m <sup>3</sup> , TWA; 8.0 mg/m <sup>3</sup> , STEL Colombia: 3.0 mg/m <sup>3</sup> , TWA inhalable Czech Republic: 2.0 mg/m <sup>3</sup> , TWA Finland: 3.5 mg/m <sup>3</sup> , TWA; 7.0 mg/m <sup>3</sup> , STEL France-INRS: 3.5 mg/m <sup>3</sup> , TWA/VME inhalable, Hong Kong: 3.5 mg/m <sup>3</sup> , TWA, Indonesia: 3.5 mg/m <sup>3</sup> , TWA/NABs Ireland: 3.5 mg/m <sup>3</sup> , TWA; 7.0 mg/m <sup>3</sup> , STEL Italy: 3.0 mg/m <sup>3</sup> , TWA inhalable Japan SOH: 4.0 mg/m <sup>3</sup> , TWA; 1.0 mg/m <sup>3</sup> , TWA respirable Korea: 3.5 mg/m <sup>3</sup> , TWA Malaysia: 3.5 mg/m <sup>3</sup> , TWA Mexico: 3.5 mg/m <sup>3</sup> , TWA Netherlands -MAC: 3.5 mg/m <sup>3</sup> , TWA inhalable Norway: 3.5 mg/m <sup>3</sup> , TWA Poland: 4.0 mg/m <sup>3</sup> TWA (NDS) (applies to carbon black containing benzo(a)pyrene

NOTE:(1) Unless otherwise indicated as "respirable" or "inhalable", the exposure limit represents a "total" value. The inhalable exhas been demonstrated to be more restrictive than the total exposure limit, by a factor of approximately 3.  
 (2) In its facilities globally, Cabot Corporation manages to the US ACGIH TLV of 3.0 mg/m<sup>3</sup> TWA inhalable

AGW: Arbeitsplatzgrenzwert

INRS: Institute National de Recherche et de Securite (National Institute of Research and Security) MAC: Maximal Aanvaarde Concentraties (Maximum allowed concentration)

MHLW: Ministry of Health, Labor and Welfare

NABS: Nilai Ambang Batas (threshold limit value)

NDS: Najwyższe dopuszczalne stezenie (8-hour occupational exposure limit)

OEL: Occupational Exposure Limit

PEL: Permissible Exposure Limit

SOH: Society of Occupational Health

STEL: Short Term Exposure Limit

TLV: Threshold Limit Value

TRGS: Technische Regeln für Gefahrstoffe (Technical Rule for Hazardous Materials)

TWA: Time Weighted Average

US ACGIH: United States American Conference of Governmental Industrial Hygienists

US OSHA: United States Occupational Safety and Health Administration

VME: Valeur Moyenne d'Exposition (Average Level of Exposure)

WEL: Workplace Exposure Limit

VLA-ED: Valor límite ambiental de exposición diaria (environmental value of daily exposure limit)

Derived No Effect Level (DNEL): As required under the EU Registration, Evaluation and Authorization of Chemicals (REACH) regulation, the Carbon Black REACH Consortium (of which Cabot Corporation is a member) developed a Derived No Effect Level (DNEL) for carbon black of 2 mg/m<sup>3</sup> inhalable based on human health studies, and 0.5 mg/m<sup>3</sup> respirable based on animal studies.

Predicted No Effect Concentration (PNEC): Not Applicable.

## 8. Risk Management recommendations

Human health measures		
Organizational	<p>A basic standard of occupational hygiene is recommended. Ensure operatives are well informed of the hazards and trained to minimize exposures.</p> <p>Ensure regular inspection and maintenance of equipment's and machines.</p> <p>Handle and store according to the indications of the Safety Data Sheet.</p>	
Protection	Eye/Face protection:	Wear eye/face protection. Wear safety glasses with

		side shields (.
	Skin protection:	Wear suitable protective clothing. Wash clothing daily. Work clothing should not be allowed out of the workplace.
	Hand protection:	Wear protective gloves to prevent soiling of hands. Use protective barrier cream before handling the product. Wash hands and other exposed skin with mild soap
	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 practice
Engineering controls	Ensure adequate ventilation to maintain exposures below occupational limits. Provide appropriate local exhaust ventilation at machinery and at places where dust can be generated.	
Environment protective measures		
Product must not be released into water without pretreatment. Neutralize wastewater before release.		




## 9. Regulatory Information / Classification and Labelling

### 9.1 Regulatory Information

EU	Not defined as a dangerous substance or preparation according to Council Directive 67/548/EEC and its various amendments and adaptations
WHMIS	This material is classified as D2A under Canadian Worker Hazardous Materials Information System (WHMIS) criteria.
OSHA	Classified as hazardous. See 29 CFR 1910.1000

### 9.2 Classification and labelling

Under GHS substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the eSDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use. Substances registered for REACH are classified according to CLP (EC) 1272/2008, implementation of the GHS in the European Union.

Classification	
<p>According to REGULATION (EC) no 1272/2008:</p> <p>Oxidizing gases; Category 1; May cause or intensify fire; oxidizer</p> <p>Gases under pressure; LG; Contains gas under pressure; may explode if heated</p> <p>Acute toxicity, Category 2; Fatal if inhaled</p> <p>Skin irritation; Category 2; Causes skin irritation</p> <p>Eye irritation; Category 2; Causes serious eye irritation</p> <p>Specific target organ toxicity – single exposure; Category 3; May cause respiratory irritation</p> <p>Acute aquatic toxicity; Category 1; Very toxic to aquatic life</p> <p>Aquatic chronic toxicity; Category 1; Very toxic to aquatic life with long lasting effects M-factor (acute) = 100</p> <p>M-factor (chronic) = 10</p>	
Signal Word	
Danger	
Pictogram	
GHS03: Flame overcircle	
GHS04: Gas cylinder	
GHS06: Skull and crossbones	
GHS09: Environment	