

Carbon Black

Section 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name:	Carbon Black
CAS Number:	1333-86-4
EC Number:	215-609-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified use:	Used as a filler in rubber and plastics, carburiser and reducing agent in metallurgy, colorant/pigment and refractory additive
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1.3 Details of the supplier of the safety data sheet

Company name:	East Harbour Group Ltd 20 Clough Road, Severalls Industrial Park Colchester, Essex, CO4 9QS United Kingdom
Telephone:	+44 (0) 333 242 0100
Email:	info@eastharbourgroup.com

1.4 Emergency telephone number

Emergency telephone:	0800 246 1274
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Section 2: Hazardous identification

2.1 Classification of the substance or mixture

According to the criteria in OSHA HCS (2012) for classifying hazardous substances, Carbon Black is not classified for any toxicological or eco-toxicological endpoint. As a combustible dust it is designated by OSHA as a hazardous chemical. See 2.2 Labelling and 2.3 "Hazards Not Otherwise Classified (HNOC)".

According to the criteria in GHS (UN) for classifying hazardous substances, Carbon Black is not classified for any physico-chemical, toxicological or eco-toxicological endpoint. See 2.3, "Other hazards which do not result in classification"

According to the criteria in Regulation (EC) No. 1272/2008 (CLP) for classifying hazardous substances, Carbon Black is not classified for any physico-chemical, toxicological or ecotoxicological endpoint.

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2.2 Label elements

WARNING: May form explosible dust-air mixture if dispersed. Keep away from all ignition sources including heat, sparks and flame. Prevent dust accumulations to minimize explosion hazard. Control dust exposures to below applicable occupational exposure limits.

Section 3: Composition/information on ingredients

3.2 Mixtures

CAS #	Content (W/W)	Ingredients
1333-86-4	100% by weight	Carbon Black

Chemical name: Carbon Black

Common name / synonyms: Furnace black, thermal black, lamp black, acetylene black

Section 4: First aid measures

4.1 Description of first aid measures

In case of skin contact: Wash skin with mild soap and water. Carbon black dust or powder may cause drying of the skin with repeated and prolonged contact. Carbon black is not a chemical skin irritant. Treat symptomatically for mechanical irritation

In case of eye contact: Rinse eyes with clean water keeping eyelid open. If symptoms develop seek medical attention. Carbon black is not a chemical eye irritant. Treat symptomatically for mechanical irritation

If swallowed: No adverse effects are expected from carbon black ingestion. Do not induce vomiting.

If inhaled: As conditions permit move person to fresh air and restore normal breathing. Short-term exposures to concentrations that are well above the occupational exposure limit may produce temporary discomfort to the upper respiratory tract, which may result in coughing and wheezing. Removal from carbon black exposure is normally sufficient to cause symptoms to subside without lasting effects. Carbon black is not a respiratory irritant, as defined by the Occupational Safety and Health Administration (OSHA) or UN GHS.

4.2 Most important symptoms and effects, both acute and delayed

See inhalation above

4.3 Indication of any immediate medical attention and special treatment needed

See inhalation above

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Section 5: Fire-fighting measures

5.1 Fire Fighting Media and Instructions:

Suitable extinguishing media: Use foam, carbon dioxide (CO₂), dry chemical, nitrogen (N₂), or water fog. A fog spray is recommended if water is used. Do not use a high pressure water stream as this may spread burning powder (burning powder will float and may spread fire). Do not use a high pressure media which could cause the formation of a potentially explosible dust-air mixture.

5.2 Special hazards arising from the substance or mixture

Explosion: Avoid generating dust; fine dust dispersed in air in sufficient concentrations and in the presence of an ignition source is a potential dust explosion hazard. May produce hazardous airborne concentrations of carbon monoxide if burning or smoldering. Carbon black can burn or smolder at temperatures greater than 400°C (>752°F) releasing hazardous products such as carbon monoxide (CO), carbon dioxide, and oxides of sulfur. At sufficient concentrations carbon monoxide, by itself, or when combined with carbon black can form an explosible hybrid mixture when dispersed in air. Wet carbon black produces very slippery walking surfaces

5.3 Advice for firefighters

Wear full protective firefighting gear including self-contained breathing apparatus (SCBA).

Section 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel:

- Wear appropriate personal protective equipment and respiratory protection to avoid skin soiling and possible mechanical irritation to eyes and upper respiratory tract from airborne dust.
- Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosible mixture if they are released into the atmosphere in sufficient concentrations. Refer to NPFA 654 for good practices.
- Remove ignition sources.
- Avoid dispersal of dust in the air (e.g., refrain from clearing dust surfaces with compressed air).
- Ensure adequate ventilation to control dust to below current occupational exposure limits.
- Wet carbon black produces very slippery walking surfaces. See Section 8.

For emergency responders:

- When airborne contaminants and concentrations cannot be immediately assessed self-contained breathing apparatus (SCBA) should be used.
- Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosible mixture if they are released into the atmosphere in sufficient concentrations. Refer to NPFA 654 for good practices.
- Remove ignition sources.
- Avoid dispersal of dust in the air (e.g., refrain from clearing dust surfaces with compressed air).
- Non-sparking tools should be used.

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- Exposure to carbon black does not require the use of special impervious clothing or gloves. Use of gloves, boots and other clothing to protect skin and work clothing from soiling is optional.

6.2 Environmental precautions

Carbon black is not a hazardous substance under the Comprehensive Environmental Response, Compensation and Liability Act (40 CFR 302), or the Clean Water Act (40 CFR 116), or a hazardous air pollutant under the Clean Air Act Amendments of 1990 (40 CFR 63).

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 and material for containment and cleaning up

Small spills should be vacuumed when possible. A vacuum equipped with HEPA (high efficiency particulate air) filtration is recommended. Large spills may be shovelled into containers. See Section 13. Avoid dispersal of dust in the air (e.g., refrain from clearing dust surfaces with compressed air). Dry sweeping is not recommended. Water spray will produce very slippery walking surfaces and will not result in satisfactory removal of carbon black contamination.

Section 7: Handling and storage

7.1 Precautions for safe handling

- Minimize dust generation and accumulation on surfaces.
- Avoid dust exposures above the occupational exposure limit.
- Use local exhaust ventilation or other appropriate engineering controls to maintain dust below the occupational exposure limit.
- Avoid contact with skin and eyes.
- Dust may cause electrical shorts if able to penetrate electrical boxes and other electrical devices, possibly creating electrical hazards resulting in equipment failure. Electrical devices should be tightly sealed or purged with clean air, periodically inspected, and cleaned, as required.
- If hot work (welding, torch cutting, etc.) is required the immediate work area must be cleared of carbon black product, dust and other combustible materials. Approved fire and heat resistant welding blankets may provide additional thermal protection from sparks and splatter. Follow standard safe practices for welding, cutting, and allied processes as described in ANSI Z49.1.
- Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Refer to NPFA 654 for good practices.
- Dry powders can build static electricity charges when subjected to the friction of transfer and mixing operations. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres.
- Some grades of carbon black may be less electrically conductive, permitting a build-up of static energy during handling. Grounding of equipment and conveying systems may be required under certain conditions. Safe work practices include the elimination of potential ignition sources in proximity to carbon black dust; good housekeeping to avoid accumulations of dust on all surfaces; appropriate exhaust ventilation design and maintenance to control airborne dust levels to below the applicable occupational exposure limit; avoidance of dry sweeping or pressurized air for cleanup; avoidance of use

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of carbon black with incompatible materials (e.g., chlorates and nitrates), and appropriate employee hazard training.

7.2 Conditions for safe storage, including any incompatibilities

Store carbon black in dry location away from ignition sources and strong oxidizers.

Carbon black is not classifiable as a Division 4.2 self-heating substance under the UN test criteria. However, current UN criteria for determining if a substance is self-heating is volume dependent, i.e., the auto-ignition temperature decreases with increasing volume. This classification may not be appropriate for large volume storage containers, e.g., silos.

Before entering vessels and confined spaces containing carbon black test for adequate oxygen, flammable gases and potential toxic air contaminants, e.g., CO.

Section 8: Exposure controls/personal protection

8.1 Control parameters

UK: 3.5, TWA, inhalable / 7.0, STEL, inhalable

8.2 Exposure controls

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

Depending on processing requirements, equipment, and the composition, concentration, and energy requirements of intermediates and/or finished products, dust control systems may require explosion relief vents, or an explosion suppression system, or an oxygendeficient environment. See NFPA 654 and 68.

Local exhaust ventilation recommended for all transfer points to mixers, blenders, batch feeding processes and point sources that may release dust to work environment.

Recommend mechanical handling to minimize human contact with dust.

Recommend ongoing preventive maintenance and housekeeping programs to minimize dust release from ventilation control systems and the build-up of dust on surfaces in work environments.

8.3 Personal protective equipment

Eye/face protection: Safety glasses or goggles are recommended as a matter of good practice.

Skin protection: Wear general protective clothing to minimize skin exposure and soiling. Work clothes should not be taken home and should be washed daily. No special glove composition is required for carbon black. General duty gloves may be used to protect hands from carbon black soiling. Use of a barrier cream may help prevent skin drying and minimize soiling. Wash hands and other exposed skin with mild soap and water.

Respiratory protection: Approved air purifying respirator (APR) should be used where airborne dust concentrations are expected to exceed occupational exposure limits. Use a positive-pressure, air supplied respirator if there is any potential for uncontrolled release, exposure levels are not known, or in circumstances where APRs may not provide adequate protection.

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Section 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	Black
Physical State	Powder or pellet
Odor	Odourless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	>3000 C
Boiling Point/Range	>3000 C
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid, gas)	Not a flammable
Explosion Limits	No information available
Vapor Pressure	No information available
Vapor Density	No information available
Specific Gravity / Density	No information available
Bulk Density	1.25-40 lb/ft ³ , 20-700 kg/m ³
Water Solubility	Insoluble
Solubility in other solvents	No information available
Partition Coefficient	No information available
Auto-ignition temperature	>140 C (>284 F) ²
Decomposition temperature	No information available

Section 10: Stability and Reactivity

10.1 Reactivity	Stable under normal ambient conditions
10.2 Chemical Stability	Stable under normal storage conditions. Prevent exposure to high temperatures and open flames
10.3 Possibility of hazardous reactions	Hazardous polymerisation will not occur under normal conditions
10.4 Conditions to avoid	Avoid high temperatures >400 C (>752 F) and sources of ignition
10.5 Incompatible materials	Avoid strong oxidisers such as chlorates, bromates and nitrates
10.6 Hazardous decomposition products	Carbon monoxide (CO), carbon dioxide (CO ₂), organic products of decomposition, oxides of sulphur form if heated above decomposition temperature

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Section 11: Toxicological Information

Product Information

11.1 Toxicological effects:

Oral LD50: LD50/oral/rat = > 8000 mg/kg (Equivalent to OECD TG 401)

Inhalation LC50: No information available

Dermal LD50: No information available

Skin corrosion/irritation:

Rabbit: not irritating. (Equivalent to OECD TG 404). Edema = 0 (max. attainable irritation score: 4). Erythema = 0 (max. attainable irritation score: 4). Assessment: Not irritating to skin.

Serious eye damage/eye irritation:

Rabbit: not irritating. (OECD TG 405). Cornea: 0 (max. attainable irritation score: 4). Iris: 0 (max. attainable irritation score: 2). Conjunctivae: 0 (max. attainable irritation score: 3). Chemosis: 0 (max. attainable irritation score: 4).

Assessment: not irritating to the eyes

Sensitisation: Guinea pig skin (Buehler Test): Not sensitising (OECD TG 406)

Assessment: Not sensitising in animals. No cases of sensitisation in humans have been reported.

Germ cell mutagenicity:

In Vitro

Carbon black is not suitable to be tested in bacterial (Ames test) and other in vitro systems because of its insolubility. However, when organic solvent extracts of carbon black have been tested, results showed no mutagenic effects. Organic solvent extracts of carbon black can contain traces of polycyclic aromatic hydrocarbons (PAHs). A study to examine the bioavailability of these PAHs showed that PAHs are very tightly bound to carbon black and not bioavailable. (Borm, 2005)

In Vivo

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" (Driscoll, 1997) which led to chronic inflammation and release of reactive oxygen species. This is considered to be a secondary genotoxic effect and, thus, carbon black itself would not be considered to be mutagenic.

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Assessment: In vivo mutagenicity in rats occurs by mechanisms secondary to a threshold effect and is a consequence of “lung overload,” which leads to chronic inflammation and the release of genotoxic oxygen species. This mechanism is considered to be a secondary genotoxic effect and, thus, carbon black itself would not be considered to be mutagenic.

Carcinogenicity: Animal 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 “lung overload” 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 (ILSI, 2000). Tumors 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.

Mortality Studies (Human Data):

A study on carbon black production workers in the UK (Sorahan, 2001) found an increased risk of lung cancer in two of the five plants studied; however, the increase was not related to the dose of carbon black. Thus, the authors did not consider the increased risk in lung cancer to be due to carbon black exposure. A German study of carbon black workers at one plant (Morfeld, 2006; Buechte, 2006) found a similar increase in lung cancer risk but, like the Sorahan, 2001 (UK study), found no association with carbon black exposure. A large US study of 18 plants showed a reduction in lung cancer risk in carbon black production workers (Dell, 2006). Based upon these studies, the February 2006 Working Group at the International Agency for Research on Cancer (IARC) concluded that the human evidence for carcinogenicity was inadequate (IARC, 2010).

Since the IARC evaluation of carbon black, Sorahan and Harrington (2007) have reanalyzed the UK study data using an alternative exposure hypothesis and found a positive association with carbon black exposure in two of the five plants. The same exposure hypothesis was applied by Morfeld and McCunney (2009) to the German cohort; in contrast, they found no association between carbon black exposure and lung cancer risk and, thus, no support for the alternative exposure hypothesis used by Sorahan and Harrington.

Overall, as a result of these detailed investigations, no causative link between carbon black exposure and cancer risk in humans has been demonstrated.

IARC Cancer Classification:

In 2006 IARC re-affirmed its 1995 finding that there is “inadequate evidence” from human health studies to assess whether carbon black causes cancer in humans. IARC concluded that there is “sufficient evidence” in

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experimental animal studies for the carcinogenicity of carbon black. IARC's overall evaluation is that carbon black is "possibly carcinogenic to humans (Group 2B)". This conclusion was based on IARC's guidelines, which generally require such a classification if one species exhibits carcinogenicity in two or more animal studies (IARC, 2010).

Solvent extracts of carbon black were used in one study of rats in which skin tumors were found after dermal application and several studies of mice in which sarcomas were found following subcutaneous injection. IARC concluded that there was "sufficient evidence" that carbon black extracts can cause cancer in animals (Group 2B).

ACGIH Cancer Classification:

Confirmed Animal Carcinogen with Unknown Relevance to Humans (Category A3 Carcinogen).

Assessment: Applying the guidelines of self-classification under the Globally Harmonized System of Classification and Labeling of

Chemicals, carbon black is not classified as a carcinogen. Lung tumors are induced in rats as a result of repeated exposure to inert, poorly soluble particles like carbon black and other poorly soluble particles. Rat tumors are a result of a secondary non-genotoxic mechanism associated with the phenomenon of lung overload. This is a species-specific mechanism that has questionable relevance for classification in humans. In support of this opinion, the CLP Guidance for Specific Target Organ Toxicity – Repeated Exposure (STOTRE), cites lung overload under mechanisms not relevant to humans. Human health studies show that exposure to carbon black does not increase the risk of carcinogenicity.

Reproductive and Developmental Toxicity:

Assessment: No effects on reproductive organs or fetal development have been reported in long-term repeated dose studies in animals.

STOT – Single Exposure:

Assessment: Based on available data, specific target organ toxicity is not expected after single oral, single inhalation, or single dermal exposure.

STOT - Repeated Exposure:

Animal Toxicity

Repeated dose toxicity: inhalation (rat), 90 days, No Observed Adverse Effect Concentration (NOAEC) = 1.1 mg/m³ (respirable). Target organ effects at higher doses are lung inflammation, hyperplasia, and fibrosis.

Repeated dose toxicity: oral (mouse), 2 yrs, No Observed Effect Level (NOEL) = 137 mg/kg (body wt.)

Repeated dose toxicity: oral (rat), 2 yrs, NOEL = 52 mg/kg (body wt.)

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Although carbon black produces pulmonary irritation, cellular proliferation, fibrosis, and lung tumors in the rat under conditions of "lung overload", there is evidence to demonstrate that this response is principally a species-specific response that is not relevant to humans.

Morbidity Studies (Human Data)

Results of epidemiological studies of carbon black production workers suggest that cumulative exposure to carbon black may result in small, non-clinical decrements in lung function. A U.S. respiratory morbidity study suggested a 27 ml decline in FEV1 from a 1 mg/m³ 8 hour TWA daily (inhalable fraction) exposure over a 40-year period (Harber, 2003). An earlier European investigation suggested that exposure to 1 mg/m³ (inhalable fraction) of carbon black over a 40-year working lifetime would result in a 48 ml decline in FEV1 (Gardiner, 2001). However, the estimates from both studies were only of borderline statistical significance. Normal age-related decline over a similar period of time would be approximately 1200 ml.

In the U.S. study, 9% of the highest non-smokers 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 conclusions that can be drawn about reported symptoms. This study, however, indicated a link between carbon black and small opacities on chest films, with negligible effects on lung function.

Inhalation Assessment

Applying the guidelines of self-classification under GHS, carbon black is not classified under STOT-RE for effects on the lung. Classification is not warranted on the basis of the unique response of rats resulting from the "lung overload" following exposure to poorly soluble particles such as carbon black. The pattern of pulmonary effects in the rat, such as inflammation and fibrotic responses, are not observed in other rodent species, non-human primates, or humans under similar exposure conditions. Lung overload does not appear to be relevant for human health. Overall, the epidemiological evidence from well-conducted investigations has shown no causative link between carbon black exposure and the risk of non-malignant respiratory disease in humans. A STOT-RE classification for carbon black after repeated inhalation exposure is not warranted.

Oral Assessment

Based on available data, specific target organ toxicity is not expected after repeated oral exposure.

Dermal Assessment

Based on available data and the chemical-physical properties (insolubility, low absorption potential), specific target organ toxicity is not expected after repeated dermal exposure.

Aspiration Hazard

Assessment: Based on industrial experience and the available data, no aspiration hazard is expected.

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Section 12: Ecological Information

12.1 Toxicity

Ecotoxicity effects

Aquatic Toxicity

Acute fish toxicity: LC50 (96 h) > 1000 mg/l,

Species: Brachydanio rerio (zebrafish),

Method: OECD Guideline 203

Acute invertebrate toxicity:

EC50 (24 h) > 5600 mg/l.

Species: Daphnia magna (waterflea),

Method: OECD Guideline 202

Acute algae toxicity:

EC50 (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 and Degradability;(Environmental fate)

Not soluble in water. Expected to remain on soil surface. Not expected to degrade.

Bioaccumulative Potential

Bioaccumulation is not expected due to physico-chemical properties of the substance.

Mobility in Soil

Not soluble in water. Not expected to migrate.

Other Adverse Effects.

No other data are available.

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Section 13: Disposal considerations

13.1 Waste treatment methods

Waste disposal of substance:

Waste should not be released to sewers. Product, as supplied, can be burned in suitable incineration facilities or should be disposed of in accordance with the regulation's issues by the appropriate authorities.

Container disposal:

Same consideration should be given as above.

Section 14: Transport Information

UN Number: No UN Number

UN Proper Shipping Name: Not regulated

Transport Hazard Class: Not regulated

Packing Group, if applicable: Not regulated

Environmental Hazards: Marine hazard: Not regulated

Special Precautions for User: None

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

Section 15: Regulatory Information

European Union

Label Information:

Carbon black is not defined as a dangerous substance or preparation according to Regulation (EC) No. 1272/2008 (CLP) or Council Directive 67/548/EEC and its various amendments and adaptations.

Symbol – none required.

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