

SAFETY DATA SHEET

Prepared in accordance with ISO 11014-1, ANSI Standard Z400.1-2004, and JIS Z 7253:2012 According to JIS Z 7253:2012, a Safety Data Sheet (SDS) is required for hazardous substances or mixtures. Carbon black is outside of the scope of the classification criteria of this standard. Therefore, the requirements of each section do not apply.

CARBON BLACK (CAS# 1333-86-4)

SECTION 1: IDENTIFICATION

- 1.1 **Product Name:** Channel Black (non-activated, mineral origin)
Common names: Carbon Black, Channel Black, Pigment Black 7
CAS Number: 1333-86-4
EINECS/EC#: 215-609-9
- 1.2 **Recommended Uses:** Additive for plastics, rubber, inks and coatings.
Restricted Uses: Cosmetics, pigments in tattoo inks for humans.
- 1.3 **Supplier/Distributor:** Chemacor International LLC
 200 Rector Place, 36C
 New York, NY 10280 USA

SECTION 2: HAZARDS IDENTIFICATION

- 2.1 **Classification of the substance or mixture:** Not hazardous according to JIS Z 7253:2012
- 2.2 **Label Elements:** Pictogram/Signal Word/Hazard & Precautionary Statements: **None**
- 2.3 **Other Hazards:** This substance is classified as hazardous as a combustible dust by the United States 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200) and the Canadian Hazardous Products Regulation (HPR) 2015. The signal word, hazard statement and precautionary statements in the United States and Canada are:
WARNING May form combustible dust concentrations in air. Keep away from all ignition sources including heat, sparks and flame. Prevent dust accumulations to minimize explosion hazard. Do not expose to temperatures above 300°C. Hazardous products of combustion can include carbon monoxide, carbon dioxide, oxides of sulfur, and organic products.
- Eye: May cause reversible mechanical irritation. Avoid contact with eyes.
- Skin: May cause mechanical irritation, soiling and drying of skin.
 No cases of sensitization in humans have been reported.
- Inhalation: Dust may be irritating to respiratory tract. Provide appropriate local exhaust ventilation at machinery and at places where dust can be generated. See also Section 8.
- Ingestion: Adverse health effects are not expected.
- Carcinogenicity: Carbon black is listed by the International Agency for Research on Cancer (IARC) as a Group 2B substance (*possibly carcinogenic to humans*). See Section 11.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1 **Chemical substance:** C (Carbon Black 100%) CAS No. 1333-86-4

SECTION 4: FIRST AID MEASURES

4.1 **First-Aid measures:**

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

Eye Contact: Flush eyes thoroughly with large volumes of water. If symptoms develop, If symptoms develop, seek medical attention.

Inhalation: Dust may be irritating to respiratory tract. Remove affected persons to a fresh air environment. If required, restore normal breathing through standard first aid measures.

Ingestion: Adverse health effects are not expected. May ingest water but do not induce vomiting.

4.2 **Most important symptoms/effects, acute and delayed:**

Irritation to the eyes or respiratory tract if exposed above the occupational exposure limits. See Sec. 2

4.3 **Indication of any immediate medical attention and special treatment needed:**

Note to physicians: Treat symptomatically

SECTION 5: FIRE-FIGHTING MEASURES

5.1 **Suitable Extinguishing Media:** Foam, CO₂, dry chemical or water spray (preferably a water fog).

Unsuitable Extinguishing Media: **DO NOT USE** a solid water stream or high pressure media, as it could cause formation of potentially explosive dust-air mixtures.

5.2 **Special hazards arising from chemical or mixture:** 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 closely observed for at least 48 hours to ensure no smoldering material is present.

Hazardous combustion products: Carbon monoxide (CO), carbon dioxide (CO₂), oxides of sulfur

5.3 **Precautions and protective equipment for fire-fighters:** Wear suitable protective equipment, self-contained breathing apparatus (SCBA). **Caution:** Wet carbon black causes slippery surfaces.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 **Personal precautions, protective equipment and emergency procedures:**

Personal precautions: CAUTION - Wet carbon black can produce slippery walking surfaces. Avoid excessive dust formation. Ensure adequate ventilation Use personal protective equipment and filter masks.

Environmental precautions: Vacuum, not sweep small spills where possible. HEPA filter equipped vacuum is recommended. Carbon black is insoluble and floats on water and should be contained by appropriate measures.

6.2 **Methods and materials for containment and cleanup:**

Methods for containment: Prevent further spillage or leakage where safe to do so.

Methods for cleanup: Vacuum, not sweep small spills where possible. HEPA filter equipped vacuums with explosion proof motors are recommended for larger spills. Residual staining of carbon black may be removed by scrubbing or power washing with liquid detergent/water solution once all loose, dry powder is removed from the area. Remove all loose powder to properly labeled and sealed containers.

SECTION 7: HANDLING AND STORAGE

- 7.1 **Precautions for safe handling:** Avoid dust exposure above occupational exposure limits. Wash exposed skin using a liquid detergent and water solution. Employ adequate exhaust ventilation to control exposures to below occupational exposure limits. Airborne dust in higher concentrations may form explosive mixtures. Operating equipment capable of producing electrical sparks or static discharges in dust-laden environments is to be prohibited.
- 7.2 **Storage conditions:** Store carbon black in dry locations 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 such as carbon monoxide.
- 7.3 **Incompatible materials:** Strong oxidizing agents

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Exposure guidelines:

Country	Concentration, mg/m ³
Argentina	3.5, TWA
Australia	3.0, TWA, inhalable
Belgium	3.6, TWA
Brazil	3.5, TWA
Canada	(Ontario) 3.0, TWA, inhalable
China	4.0, TWA 8.0, TWA, STEL (15 min)
Colombia	3.0, TWA, inhalable
Czech Republic	2.0, TWA
Egypt	3.5, TWA
Finland	3.5, TWA 7.0, STEL
France – INRS	3.5, TWA/VME inhalable
Germany – AGW	1.5, TWA, respirable; 4.0, TWA, inhalable
Germany – TRGS 900	3.0, TWA, respirable; 10, TWA, inhalable
Hong Kong	3.5, TWA
Indonesia	3.5, TWA/NABs
Ireland	3.5, TWA; 7.0, STEL
Italy	3.5, TWA, inhalable
Japan – MHLW	3.0
Japan – SOH	4.0, TWA; 1.0, TWA, respirable
Korea	3.5, TWA
Malaysia	3.5, TWA
Mexico	3.5, TWA
Russia	4.0, TWA
Spain	3.5, TWA (VLA-ED)
Sweden	3.0, TWA
United Kingdom	3.5, TWA, inhalable 7.0, STEL, inhalable
EU REACH DNEL	2.0 (inhalable); 0.5, TWA respirable
United States	3.5, TWA, OSHA-PEL 3.0, TWA, ACGIH-TLV®, inhalable 3.5, TWA, NIOSH-REL

Glossary:

ACGIH®	American Conference of Governmental Industrial Hygienists
mg/m ³	milligrams per cubic meter
DNEL	Derived no-effect level
NIOSH	National Institute for Occupational Safety and Health
OES	occupational exposure standard
OSHA	Occupational Safety and Health Administration
PEL	permissible exposure limit
REL	recommended exposure limit
STEL	short-term exposure limit
TLV	threshold limit value
TRGS	Technische Regeln für Gefahrstoffe (Technical Rules for Hazardous Substances)
TWA	time weighted average, eight (8) hours unless otherwise specified

8.2 Exposure controls:

Engineering controls:

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

Personal protective equipment (PPE):

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

Skin protection: Wear general protective clothing to minimize skin exposure and soiling. Work clothes should be laundered on site daily. Tyvek suits may be used over clothes to minimize exposure. No special glove composition is required for carbon black. Wash hands and other exposed skin with mild soap and water solution.

Respiratory protection: Approved air purifying respirator (APR) should be used where airborne dust concentrations are expected to exceed occupational exposure

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance	fine pellet
Color	black
Odor	odorless
Odor threshold:	not applicable
Melting point:	≈3550°C
Boiling point:	>3000°C
Vapor pressure	not applicable
Vapor Density	not applicable
Flash Point	not applicable
Flammability	not a flammable solid*
Evaporation rate	not applicable
Density:	20°C 1.7 – 1.9 g/cm ³
Solubility (in Water):	insoluble
pH value:	3-5 [50 g/l water, 68°F (20°C)]
Partition coefficient	(n-octanol/water): not applicable
Viscosity:	not applicable
Decomposition temperature:	not applicable
Volatile Content:	<1.0 %
Auto-ignition temperature	>600°F (>315°C) EINECS/EC# 215-609-9 >932°F (>500°C) ICSC: 0471 (April, 2017)
Minimum Ignition Temperature (VDI 2263)	
BAM Furnace	>932°F (>500°C)
Godbert-Greenwald Furnace	>600°F (>315°C)
Minimum Ignition Energy	>10 J
Burn Rate (VDI 2263, EC 84/449)	>45 seconds (not classifiable as “Highly Flammable”, or “Easily Ignitable”)

- Not a flammable solid, per test method N.1 as described in Part III, sub-section 33.2.1 of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria
- Not classifiable as a Division 4.2 self-heating substance as defined by UN Recommendations on the Transport of Dangerous Goods and the International Maritime Dangerous Goods Code. (Based on 100mm sample cube.)

SECTION 10: STABILITY AND REACTIVITY

10.1 **Reactivity:** May react exothermically upon contact with strong oxidizers.

10.2 Chemical Stability:

Stability: Stable under normal handling and storage conditions.

Explosivity: Not sensitive to mechanical impact. Dust in high concentrations may form explosive mixture in air. Do not use compressed air or vigorous sweeping with carbon black. Take precautionary measures against static discharges/electrical sparking in the vicinity and ground all equipment.

Possibility of hazardous reactions: None under normal processing.

Possibility of hazardous polymerization Does not occur.

Conditions to avoid: Avoid high temperatures >300 °C

Incompatible materials: Strong oxidizing agents

Hazardous decomposition products: CO², CO, sulfur oxides, organic combustion products

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Acute Toxicity

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

Inhalation LC50: No data available

Dermal LD50: No data 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.

Sensitization: Guinea pig skin (Buehler Test): Not sensitizing (OECD TG 406).

Assessment: Not sensitizing in animals. No cases of sensitization 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 leads 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.

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 re-analyzed 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 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 (STOT-RE), 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.)

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.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity, Aquatic toxicity:

Acute fish toxicity: LC0 (96 h) 1000mg/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 10,000 mg/l, Species: *Scenedesmus subspicatus*, Method: OECD Guideline 201

12.2 **Persistence and degradability:** Insoluble in water. Migration in soil without significant degradation.

12.3 **Bioaccumulative potential:** Not expected due to carbon black's physicochemical properties.

12.4 **Mobility in soil:** Not expected to migrate but remain on soil surface.

12.5 **PBT and vPvB assessment:** Carbon black is not a PBT or vPvB.

12.6 **Other adverse affects:** No information available.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 **Waste treatment methods:** Product should be disposed of in accordance with the regulations issued by the appropriate federal, provincial, state, and local authorities. Empty packaging must be disposed of in accordance with national and local laws.

EU Waste Code: No. 61303.

RCRA: Not a hazardous waste under U.S. RCRA, 40 CFR 261.

Canadian Waste Classification: Not a hazardous waste under provincial regulations.

SECTION 14: TRANSPORT INFORMATION

14.1 The following organizations do not classify carbon black as a "hazardous cargo" if it is "carbon black, non-activated, mineral origin". Chemacor International's Carbon Black meets the definition of a non-activated carbon black of mineral origin.

	<u>DOT</u>	<u>ICAO (air)</u>	<u>IATA</u>	<u>IMDG</u>	<u>RID</u>	<u>ADR</u>
UN/ID no	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
Proper Shipping Name	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
Hazard Class	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
Packing group	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated

SECTION 15: REGULATORY INFORMATION

15.1 Industrial Safety and Health Law (ISHL): Notification Obligation (SDS): Carbon black (≥0.1%)
Mandatory Labeling (label): Carbon black (≥1%)

International Inventories: Carbon black, CAS No.1333-86-4, appears in and is in compliance with the following inventories:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

ENCS - Japan Existing and New Chemical Substances

IECSC - China Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

AICS - Australian Inventory of Chemical Substances

NZIoC - New Zealand Inventory of Chemicals

TCSI - Taiwan Chemical Substance Inventory

SECTION 16: OTHER INFORMATION

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 procedures 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.
