

Material Safety Data Sheet



CARBON BLACK

Material number		Version	1.0 / US
Specification	000001000047	Revision Date	05/18/2015
		Print Date	05/18/2015

Emergency telephone number CHEMTREC (chemical emergencies only): +1 (800) 424-9300
Orion Product Regulatory Services: +1 (832) 445-3300

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : CARBON BLACK

Trade name

ARO 60

CORAX: HP 130, HP 160, HP 170S, HP 180, HP 200 LS, HP 1107, HP 1125, MAF, N110, N115, N120, N121, N134, N220, N220 MP, N231, N234, N299, N326, N326 D, N326 MP, N330, N330 MP, N330 T, N339, N347, N351, N375, N550, N550/20, N650, N660, N683, N762, N772, N774, N787, N990

DUREX 0

ECORAX: 1670, 1720, 1830, 1990, S 204, S 206, S 247

PUREX: HS 20, HS 22, HS 25, HS 33, HS 40, HS 45, HS 45 RP, HS 55, LS 18, LS 35

SABLE: 6500, 7700

ARO, CORAX, DUREX, ECORAX, PUREX, SABLE are trademarks or registered trademarks of Orion Engineered Carbons GmbH.

Chemical nature : Substance

Manufacturer or supplier's details

Company name of supplier : Orion Engineered Carbons LLC

Address : 4501 Magnolia Cove Dr Suite 106
Kingwood TX 77345, USA

Telephone : (832) 445-3300

Telefax : (281) 318-2164

E-mail address : sds-amr@orioncarbons.com

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Recommended use of the chemical and restrictions on use

Recommended use : Rubber - producing and processing industry
Reinforcing fillers

Restrictions on use : Tattoo

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	solid, powder / beads
Colour	black

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Odour	odourless
Hazard Summary	<p>A black, odourless, insoluble, powder that can burn or smoulder at temperatures greater than 752°F (400°C, VDI 2263).</p> <p>Hazardous products of decomposition can include carbon monoxide, carbon dioxide, and oxides of sulphur.</p> <p>May cause reversible mechanical irritation to the eyes and respiratory tract, especially at concentrations above the occupational exposure limit.</p> <p>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.</p> <p>May form explosible dust-air mixture if dispersed.</p>

OSHA Regulatory status : According to the criteria in OSHA HCS (2012) 29 CFR 1910.1200 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.

GHS Classification

Not a dangerous substance or mixture according to the Globally Harmonised System (GHS). 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.

GHS Label element

Hazard pictograms : Not assigned by regulation

Signal word : Warning

Precautionary statements : 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.

Potential Health Effects

Primary Routes of Entry : Inhalation
Eye contact
Skin contact

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

Skin : May cause mechanical irritation, soiling, and skin drying.

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- No cases of sensitization in humans have been reported.
- Eyes : High dust concentrations may cause mechanical irritation to eye.
 - Ingestion : No evidence of adverse effects from available data.
 - Chronic Exposure : Long-term exposure below the current occupational exposure limit of 3.5 mg/m3 (when measured as traditional total dust) may result in a small loss in one aspect of lung function (FEV1) over a working life-time.

IARC listed: Group 2B (possibly carcinogenic to humans). Not listed as a carcinogen by NTP, ACGIH, OSHA, or the European Union. See Section 11.

However, the manufacturers of carbon black state that epidemiologic studies of workers in the carbon black industry in the U.S. and W. Europe show no significant adverse health effects due to occupational exposure. This product contains one or more ingredients that have been shown to produce mutagenic effects in in vitro testing.

Most carbon blacks contain trace quantities of PAHs present at levels less than 0.1% unless otherwise specified by the supplier. 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. See Section 16.

Some studies have linked exposure of carbon black dust to lung effects.

- Aggravated Medical Condition : Asthma
Respiratory disorder

Carcinogenicity:

- IARC : Group 2B: Possibly carcinogenic to humans, see section 11.
- ACGIH : Confirmed animal carcinogen with unknown relevance to humans, see section 11.
- OSHA : Not classifiable as a human carcinogen, see section 11.
- NTP : Not classifiable as a human carcinogen, see section 11.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

- Substance / Mixture : Pure substance
- Chemical nature : Substance

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Composition / information on ingredients / hazardous components

Chemical Name	CAS-No.	Concentration (%)
Carbon Black, amorphous	1333-86-4	100
EINECS-No.: 215-609-9		

SECTION 4. FIRST AID MEASURES

- If inhaled : Restore normal respiration with first aid measures as necessary.
If cough, dyspnoea or other respiratory problems occur, bring exposed persons out into the fresh air. Consult a physician if symptoms persist.
- In case of skin contact : Carefully wash off skin with soap and water. Consult a physician if symptoms occur.
- In case of eye contact : Possible discomfort is due to foreign substance effect.
Rinse thoroughly with plenty of water keeping eyelid open.
In case of persistent discomfort: Consult an ophthalmologist.
- If swallowed : Do not induce vomiting
Rinse mouth with water.
If conscious, drink plenty of water.
Never give by mouth to anyone, who faints quickly, becomes unconscious or has cramps.
After absorbing large amounts of substance / In case of discomfort: Supply with medical care.
- Notes to physician : After absorbing large amounts of substance:
Acceleration of gastrointestinal passage

SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use foam, carbon dioxide (CO₂), nitrogen (N₂), dry chemical or water spray. Use of atomized spray is recommended if water is used.
- Unsuitable extinguishing media : Do not use full-force water jet in order to avoid dispersal and spread of the fire.
- Specific hazards during fire-fighting : May be released in case of fire: carbon monoxide, carbon dioxide, sulphur oxides, organic products of decomposition.
- Specific extinguishing methods : No specific measures identified.
- Further information : Carbon Black does not burn with an open flame and fire may not be noticed until material is poked to reveal visible sparks.
Carbon Black that has burnt once should be observed carefully for at least 48 hours.
Water used to extinguish fire should not enter drainage sys-

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tems, soil or stretches of water.
 Ensure there are sufficient retaining facilities for water used to extinguish fire.
 Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

Special protective equipment for firefighters : In case of fire: wear a self contained respiratory apparatus

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Caution: Moist industrial soot causes dangerously slick surfaces. Avoid dust formation. Ensure sufficient ventilation. Use personal safety equipment. See also Section 8.

Environmental precautions : Do not allow material to enter the groundwater system. Product floats on water and does not dissolve. If possible, try to keep floating material together. If larger amounts of spilt material cannot be contained, local authorities should be informed. Do not allow entrance in sewage water, soil stretches of water, groundwater, drainage systems.

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).

Methods and materials for containment and cleaning up : Vacuum up immediately. A vacuum cleaner with a high-efficiency filtration system is recommended. To avoid raising dust do not use brooms or compressed air. Collect and place in correctly labelled containers. For disposal see Section 13. Avoid dust formation.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling : Avoid contact with eyes and skin. Do not inhale dust. Ensure sufficient ventilation and extraction at processing machines and locations where dust may form. Use no brooms or compressed air to avoid raising dust. Fine dust may cause electrical short circuiting or penetrate into electrical devices that are not completely sealed. Take measures to prevent electrostatic charging. If work under hot conditions is unavoidable (welding, torch cutting, etc.), the working area must be kept as free as possible of soot product and dust.
 Provide sufficient ventilation and exhaust at the workplace.

In closed containers such as silos or poorly ventilated store rooms, carbon monoxide may be present. For this reason, sources of ignition should be kept clear and respiratory equipment independent of surrounding air should be worn as a precautionary measure.
 When repairs of the production system are to be made (e.g.

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welding work), the section to be repaired must be essentially free of product.

Take measures to prevent the build up of electrostatic charge. Keep away from sources of ignition - No smoking.

Conditions for safe storage : Store cool and dry in a well-ventilated location. Keep away from heat and ignition sources. Do not store together with strong oxidants. Do not store together with volatile compounds, since they may be adsorbed. Store in correctly labelled containers.

Carbon black is not classifiable as a Division 4.2 self-heating substance under the UN test criteria. However, the 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.

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 standard safe practices when entering confined spaces.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Carbon Black, amorphous	1333-86-4	TWA (Inhalable fraction.)	3.0 mg/m3	ACGIH-TLV
		TWA	3.5 mg/m3	OSHA-PEL
		TWA	3.5 mg/m3	NIOSH REL

Engineering measures : Use process enclosures and/or exhaust ventilation to keep airborne dust concentrations below the 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 oxygen-deficient 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 house-keeping programs to minimize dust release from ventilation control systems and the build-up of dust on surfaces in work environments. See NFPA 654.

Except for approved power-operated trucks designated as EX,

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power-operated industrial trucks shall not be used in atmospheres containing hazardous concentrations of carbon black dust.

Personal protective equipment

Respiratory protection : If workplace exposure limits are exceeded and/or larger amounts are released (leakage, spilling, dust) the indicated respiratory protection should be used.
 Dust mask with P2 particle filter

Approved air purifying respirator (APR) for particulates 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.

When respiratory protection is required to minimize exposures to carbon black, programs should follow the requirements of the appropriate governing body for the country, province or state.

See OSHA 29 CFR 1910.134

Hand protection
Material

: No special glove composition is required for carbon black. Gloves may be used to protect hands from carbon black soiling.
 Recommendation:
 Wear protective gloves made of the following materials: natural latex (NR), PVC, nitrile rubber (NBR).
 The data about break through time/strength of material is not valid for undissolved solids/dust.

Eye protection

: Safety glasses with side-shields
 If dust occurs: basket-shaped glasses

Skin and body protection

: When using, do not eat, drink or smoke. Wash face and/or hands before break and end of work.
 Use of a barrier cream may help prevent skin drying and minimize soiling.
 Wash hands and other exposed skin with mild soap and water.
 To ensure ideal skin protection: use super fatted soaps and skin cream for skin care.
 When handling larger quantities:
 chemical protective suit or disposable protective clothing
 Remove and wash contaminated clothing before re-use.
 Wear general protective clothing to minimize skin contact.
 Work clothes should not be taken home and should be washed daily.

Protective measures

: If there is the possibility of skin/eye contact, the indicated hand/eye/body protection should be used.
 Handle in accordance with good industrial hygiene and safety

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practice.

Hygiene measures

: When using, do not eat, drink or smoke. Wash face and/or hands before break and end of work.
To ensure ideal skin protection: use super fatted soaps and skin cream for skin care.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : solid, powder / beads

Colour : black

Odour : odourless

Odour Threshold : Not applicable

pH : ≥ 6.5 , Concentration: 50 g/l (20 °C)(68 °F)

Melting point/range : $> 3,000$ °C
or
 $> 5,432$ °F

Boiling point/boiling range : $> 3,000$ °C
or
 $> 5,432$ °F

Flash point : Not applicable

Evaporation rate : Not applicable

Flammability (solid, gas) : > 45 s
Method: VDI 2263

The substance is not a flammable solid.
Method: UN method N.1

Upper explosion limit : not determined

Lower explosion limit : 50 g/m³
Medium: Dust.
Method: VDI 2263

Vapour pressure :
Remarks: Not applicable

Relative vapour density : Not applicable

Density : 1.7 - 1.9 g/cm³ (20 °C)
or (68 °F)

Solubility(ies)
Water solubility : insoluble

Solubility in other solvents : Description: insoluble

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Partition coefficient: n-octanol/water	: Not applicable
Auto-ignition temperature	: > 600 °C or > 1,112 °F Method: VDI 2263 Remarks: (BAM-furnace)
Thermal decomposition	: > 400 °C or > 752 °F Method: VDI 2263 Smoulder temperature
Viscosity	
Viscosity, dynamic	: Not applicable
Viscosity, kinematic	: Not applicable
Explosive properties	: Kst = 30 - 100 bar m/s Dust explosion class St1 Minimum ignition energy > 1 kJ Dusts can form explosive mixtures with air. see section 7.
Impact sensitivity	: Not impact sensitive.
Maximal absolute explosion pressure	: 10 bar Method: VDI 2263
Metal corrosion	: Remarks: not determined
Auto-flammability	: > 140 °C or > 284 °F Method: IMDG-Code Remarks: Volume-dependent parameter, measured temperature refers to the 1 l sample

Remarks: 100 mm sample cube. Not classifiable as a Division 4.2 self-heating substance as defined by UN Recommendations on the Transport of Dangerous Goods and IMDG.

SECTION 10. STABILITY AND REACTIVITY

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- Reactivity** : Stable under normal conditions.
- Carbon black cannot easily be caused to explode and therefore there is no danger in practical use.
- However, in special test procedures a carbon black/air mixture can explode.
- Chemical stability** : The product is chemically stable.
- Possibility of hazardous reactions** : Hazardous polymerisation does not occur.
Will not occur under normal conditions.
- Carbon black cannot easily be caused to explode and therefore there is no danger in practical use.
However, in special test procedures a carbon black/air mixture can explode.
Take measures to prevent electrostatic discharges. Avoid dust formation. All metal parts of the mixing and processing machines must be earthed. Make sure all equipment is grounded before loading operations.
- Conditions to avoid** : Avoid heat effect and sources of ignition.
Avoid temperatures above 400 °C (752 °F).
- Incompatible materials** : Avoid contact with strong oxidants.
- Hazardous decomposition products** : Carbon monoxide
Carbon dioxide (CO₂)
organic products of decomposition
sulphoxides

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Product:

Acute oral toxicity : LD50 (Rat): > 8,000 mg/kg
Method: Equivalent to OECD Test Guideline 401
Assessment: The substance or mixture has no acute oral toxicity

Skin corrosion/irritation

Product:

Species: Rabbit
Method: Equivalent to OECD Test Guideline 404
Result: not irritating
Remarks: Oedema, = 0 (max. attainable irritation score: 4)

Remarks: Erythema, = 0 (max. attainable irritation score: 4)

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Serious eye damage/eye irritation

Product:

Species: Rabbit
 Result: not irritating
 Method: OECD Test Guideline 405
 Remarks: Cornea, = 0 (max. attainable irritation score: 4)

Remarks: Iris, = 0 (max. attainable irritation score: 2)

Remarks: Conjunctiva, = 0 (max. attainable irritation score: 3)

Remarks: Chemosis, = 0 (max. attainable irritation score: 4)

Respiratory or skin sensitisation

Product:

Test Type: Buehler Test
 Species: Guinea pig
 Method: OECD Test Guideline 406
 Result: not sensitizing to the skin
 Remarks: No evidence of sensitization was found in animals.
 No cases of sensitization in humans have been reported.

Germ cell mutagenicity

Product:

Genotoxicity in vitro : Remarks: Carbon Black is not suitable to be tested in bacterial (Ames test) and other in vitro systems because of its insolubility. When tested, however, results for Carbon Black showed no mutagenic effects. Organic solvent extracts of Carbon Black can, however, 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 5).

Genotoxicity in vivo : Remarks: 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 genotoxic oxygen species.

Germ cell mutagenicity- Assessment : Not a mutagen

In vivo mutagenicity in rats is occurring by mechanisms secondary to a threshold effect and a consequence of "lung overload" which led to chronic inflammation and 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.

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Carcinogenicity

Product:

Species: Rat
 Application Route: Oral
 Exposure time: 2 years
 Remarks: no tumours

Species: Rat
 Application Route: Inhalation
 Exposure time: 2 years
 Remarks: lungs / inflammation, fibrosis, tumours

Remarks: exposure under overload conditions

Remarks: Note: Tumours 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 poorly soluble inorganic particles and appear to be rat specific. Tumours 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.

Remarks: Lung tumours in rats are the result of exposure under "lung overload" conditions. The development of lung tumours in rats is specific to this species. Mouse and hamster do not develop lung tumours under similar test conditions. The CLP guidance on classification and labelling states, that „lung overload" in animals is listed under mechanism not relevant to humans. 4)

Species: Mouse
 Application Route: Oral
 Exposure time: 2 years
 Remarks: no tumours

Species: Mouse
 Application Route: Dermal
 Exposure time: 18 months
 Remarks: no tumours

Carcinogenicity - Assessment : Not carcinogenic

Reproductive toxicity

Product:

Effects on fertility : Remarks: No experimental studies on effects of Carbon Black on fertility and reproduction have been located. However, based on the toxicokinetics data, Carbon Black is deposited in the lungs and based on its specific chemical-physical properties (insolubility, low absorption potential), it is not likely to distribute in the body to reach reproductive organs, embryo and/or foetus under in vivo conditions. Therefore, no adverse effects of Carbon Black to fertility/reproduction are expected. No effects have been reported in long-term animal studies.

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Effects on foetal development : Remarks: No experimental studies on effects of Carbon Black on foetal development have been located. However, based on the toxicokinetics data, Carbon Black is deposited in the lungs and based on its specific chemical-physical properties (insolubility, low absorption potential), it is not likely to distribute in the body to reach reproductive organs, embryo and/or foetus under in vivo conditions. Therefore, no adverse effects of Carbon Black to foetal development are expected.

Reproductive toxicity - Assessment : Not a reproductive toxin
Not a teratogen

STOT - single exposure**Product:**

Remarks: Based on the information available, organ-specific toxicity is not to be expected after one single exposure.

STOT - repeated exposure**Product:**

Remarks: Effects in the rat lung are considered to be related to the "lung overload phenomenon" 1 & 6 & 7 & 8 & 9) 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.

Remarks: Based on the information available, organ-specific toxicity is not to be expected after repeated exposure.

Repeated dose toxicity**Product:**

Species: Rat
No observed adverse effect concentration: 1 mg/m³
Application Route: inhalation (respirable fraction)
Exposure time: 90 d
Target Organs: lungs / inflammation, hyperplasia, fibrosis

Species: Mouse
NOEL: 137 mg/kg
Application Route: Oral
Exposure time: 2 yr

Species: Rat
NOEL: 52 mg/kg
Application Route: Oral
Exposure time: 2 yr

Aspiration toxicity**Product:**

No aspiration toxicity classification

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Experience with human exposure**Product:**

- General Information: 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 "sufficient evidence in experimental animals for the carcinogenicity of Carbon Black," IARC's overall evaluation 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 animal species exhibits carcinogenicity in two or more studies. Lung tumours in rats are the result of exposure under "lung overload" conditions. The development of lung tumours in rats is specific to this species. Mouse and hamster showed no carcinogenicity in similar studies.
- General Information: In 2006 IARC re-affirmed its 1995 classification of Carbon Black as, Group 2B (possibly carcinogenic to humans).
- General Information: Overall, as a result of the detailed epidemiological investigations, no causative link between Carbon Black exposure and cancer risk in humans has been demonstrated. This view is consistent with the IARC evaluation in 2006. Furthermore, several epidemiological and clinical studies of workers in the Carbon Black production industries show no evidence of clinically significant adverse health effects due to occupational exposure to Carbon Black. No dose response relationship was observed in workers exposed to Carbon Black.
- General Information: Applying the rules of the Globally Harmonized System of Classification and Labelling (GHS, e.g. UN 'Purple Book', EU CLP Regulation) the results of repeated dose toxicity and carcinogenicity studies in animals do not lead to classification of Carbon Black for Specific target organ toxicity (Repeated exposure) and carcinogenicity. UN GHS says, that even if adverse effects are seen in animal studies or in-vitro tests, no classification is needed if the mechanism or mode of action is not relevant to humans. 2) The European CLP Regulation also mentions, that no classification is indicated, if the mechanism is not relevant to humans. 3) Furthermore, the CLP guidance on classification and labelling states, that „lung overload“ in animals is listed under mechanism not relevant to humans. 4)
- General Information: Results of epidemiological studies of Carbon Black production workers suggest that cumulative exposure to Carbon Black may result in small decrements in lung function. 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 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. 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.
- General Information: The relationship between other respiratory symptoms and exposure to Carbon Black is even less clear. In the U.S. study, 9% of the highest

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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.

- General Information: A study on Carbon Black production workers in the UK 10) 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 11 & 12 & 13 & 14) found a similar increase in lung cancer risk but, like the 2001 UK study 10), found no association with Carbon Black exposure. In contrast, a large US study 15) of 18 plants showed a reduction in lung cancer risk in Carbon Black production workers. Based upon these studies, the February 2006 Working Group at IARC concluded that the human evidence for carcinogenicity was inadequate. 1)
- General Information: Since this IARC evaluation of Carbon Black, Sorahan and Harrington 16) 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 17 & 18) 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 16). Morfeld and McCunney 19) applied a Bayesian approach to unravel the role of uncontrolled confounders and identified smoking and prior exposure to occupational carcinogens received before being hired in the Carbon Black industry as main causes of the observed lung cancer excess risk.
- General Information: Overall, as a result of these detailed investigations, no causative link between Carbon Black exposure and cancer risk in humans has been demonstrated. This view is consistent with the IARC evaluation in 2006.
- General Information: Several epidemiological and clinical studies of workers in the Carbon Black production industries show no evidence of clinically significant adverse health effects due to occupational exposure to Carbon Black.
- General Information: No dose response relationship was observed in workers exposed to Carbon Black.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

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- Toxicity to fish : LC0 ((Brachydanio rerio)): 1,000 mg/l
Exposure time: 96 h
Method: OECD 203

LC0 (Leuciscus idus melanotus): > 5,000 mg/l
Exposure time: 14 d
Method: DIN 38412 part 15
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna): > 5,600 mg/l
Exposure time: 24 h
Method: OECD 202
- Toxicity to algae : EC50 (scenedesmus subspicatus): > 10,000 mg/l
Exposure time: 72 h
Method: OECD 201

NOEC (scenedesmus subspicatus): > 10,000 mg/l
Exposure time: 72 h
Method: OECD 201
- Toxicity to bacteria : EC0 (local activated sludge): > 400 mg/l
Exposure time: 3 h
Method: DEV L3 (TTC test)

: EC10 (local activated sludge): 800 mg/l
Exposure time: 3 h
Method: DEV L3 (TTC test)
- Ecotoxicology Assessment
Acute aquatic toxicity : Carbon Black is an inert, inorganic and water insoluble substance therefore its bioavailability for aquatic organisms is low. As an element it has not further reactive or functional groups and an acute toxicity is not expected.
- Chronic aquatic toxicity : Carbon Black is an inert, inorganic and water insoluble substance therefore its bioavailability for aquatic organisms is low. As an element it has not further reactive or functional groups and a chronic toxicity is not expected.
- Toxicity Data on Soil : As an inert solid substance, insoluble in water and organic solvents diffusion through membranes or uptake and bioaccumulation to terrestrial organisms is not expected. Based on the available data, Carbon Black is not considered as toxic to terrestrial organism.

Persistence and degradability

Product:

- Biodegradability : Remarks: Carbon Black is substantially elemental carbon. The substance is inorganic and can not be further biodegraded by microorganisms
- Physico-chemical removability : Remarks: Carbon Black is substantially elemental carbon. It is inert and contains no functional or water-soluble groups. It cannot be further degraded by hydrolysis, light or by photo-

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degradation in air or in surface water.

Impact on Sewage Treatment : Based on the available data, Carbon Black is not expected to interfere with the operation of sewage treatment plants.

Components:

Carbon Black, amorphous:

Stability in water : Remarks: The product is insoluble and floats on water.

Bioaccumulative potential

Product:

Bioaccumulation : Remarks: Based on the physical-chemical properties of Carbon Black as an inert solid, its insolubility and stability in water and in organic solvents, diffusion through membranes of organisms and therefore bioaccumulation is not expected.

Mobility in soil

Product:

Stability in soil : Remarks: Carbon Black is an inert solid. It is stable and insoluble in water or organic solvents. Its vapour pressure is negligible. Based on these properties it is expected that Carbon Black will not occur in air or water in relevant amounts. Also potential for distribution via water or air, respectively, can be dismissed. The deposition in soil or sediments is therefore the most relevant compartment of fate in the environment.

Other adverse effects

Product:

Results of PBT and vPvB assessment : Not a PBT, vPvB substance as per the criteria of the REACH Ordinance.

Additional ecological information : No negative effects known.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : In accordance with local and national regulations. Observe national regulations.

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.

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

Contaminated packaging : Return reusable containers to manufacturer. Paper bags may be incinerated, or recycled, or disposed of in

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an appropriate landfill in accordance with national and local laws.

Non-contaminated packaging may be re-used.
Contaminated packaging should ideally be emptied; it can then be recycled after having been decontaminated.
Packaging which cannot be decontaminated should be disposed of like the material.

SECTION 14. TRANSPORT INFORMATION

14.1 UN number

Not regulated as a dangerous good

14.2 UN proper shipping name

Not regulated as a dangerous good

14.3 Transport hazard class(es)

Not regulated as a dangerous good

14.4 Packing group

Not regulated as a dangerous good

14.5 Environmental hazards

Not regulated as a dangerous good

14.6 Special precautions for user

Remarks : U.S. DOT Transport Information: not regulated.
U.S. Rail Regulations: not classified.

Not classified as dangerous in the meaning of transport regulations.
Non-activated carbon black of mineral origin.
No hazardous material of division 4.2

Seven (7) ASTM reference carbon blacks were tested according to the UN method, Self Heating Solids, and found to be "Not a self-heating substance of Division 4.2"; the same carbon blacks were tested according to the UN method, Readily Combustible Solids, and found to be "Not a readily combustible solid of Division 4.1"; under current UN Recommendations on the Transport of Dangerous Goods.

Not dangerous goods in the meaning of ADR/RID, ADNR, IMDG-Code, ICAO/IATA-DGR

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

SECTION 15. REGULATORY INFORMATION

OSHA Hazards : According to the criteria in OSHA HCS (2012) 29 CFR 1910.1200 for classifying hazardous substances, Carbon Black is not classified for any toxicological or eco-toxicological

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endpoint. As a combustible dust it is designated by OSHA as a hazardous chemical.

- SARA 311/312 Hazards** : 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 – SDS requirements, carbon black is determined to be hazardous according to the following EPA hazard categories:
 Acute Health Hazard
 no
 Chronic Health Hazard
 yes
 Sudden Release of Pressure Hazard
 no
 Reactivity Hazard
 no

- SARA 313** : Superfund Amendments and Reauthorization Act (SARA) Title III Section 313 Toxic Substances: Does not contain any components subject to this section.

- California Prop 65** : US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)
 "Carbon black (airborne, unbound particles of respirable size)" is a California Proposition 65 listed substance.

- : .
- : Additional regulatory information
- : OSHA Hazard Communication Standard (29 CFR 1910.1200)
- : 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. Section 1.5.1 indicates that the de minimis exemption (i.e., disregarding amounts less than 0.1%) has been eliminated for PACs. Carbon black may contain certain of these PACs and the user is advised to evaluate their own TRI reporting responsibilities. (Note: Benzo (g,h,i) perylene is listed separately and has a 10 lb. reporting threshold.)
- : Note: Readers are urged to review their national, provincial, state, and local safety, health, and environmental regulations, as well as their carbon black supplier's safety data sheet (SDS). Specific questions should be addressed to your carbon black supplier.

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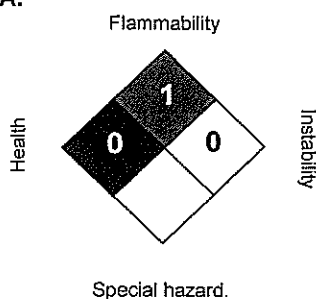
Inventories

AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TSCA (USA)

SECTION 16. OTHER INFORMATION

Further information

NFPA:



HMIS III:

HEALTH	1*
FLAMMABILITY	1
PHYSICAL HAZARD	0

0 = not significant, 1 = Slight,
2 = Moderate, 3 = High
4 = Extreme, * = Chronic

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.

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Changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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Legend

ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ASTM	American Society for Testing and Materials
ATP	Adaptation to Technical Progress
BCF	Bioconcentration Factor
BetrSichV	German Ordinance on Industrial Safety and Health
c. c.	closed cup (geschlossenes Gefäß)
CAS	Chemical Abstract Services
CESIO	European Committee of Organic Surfactants and their Intermediates
ChemG	German Chemicals Act
CMR	Carcinogenic-Mutagenic-toxic for Reproduction
DIN	German Institute for Standardization
DNEL	Derived No Effect Level
EINECS	European Inventory of Existing Commercial Chemical Substances
GefStoffV	German Ordinance on Hazardous Substances
GGVSEB	German ordinance for road, rail and inland waterway transportation of dangerous goods
GGVSee	German ordinance for sea transportation of dangerous goods
GLP	Good Laboratory Practice.
GMO	Genetic Modified Organism
IATA DGR	International Air Transport Association – Dangerous Goods Regulations
ICAO-TI	International Civil Aviation Organisation - Technical Instructions
IMDG Code	International Maritime Dangerous Goods Code
ISO	International Organization For Standardization
LOAEL	Lowest Observed Adverse Effect Level
LOEL	Lowest Observed Effect Level
NOAEL	No Observed Adverse Effect Level
NOEC	No Observed Effect Concentration
NOEL	No Observed Effect Level
o. c.	open cup (offenes Gefäß)
OECD	Organisation for Economic Cooperation and Development
OEL	Occupational Exposure Limit
PBT	Persistent, Bioaccumulative, Toxic
PEC	Predicted Effect Concentration
PNEC	Predicted No Effect Concentration
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
TA	Technical Instructions (German Ordinance)
TPR	Third Party Representative (Art. 4)
TRGS	Technical Rules for Hazardous Substances (German Regulations)
VCI	German "Verband der Chemischen Industrie e. V."
vPvB	Very Persistent, Very Bioaccumulative
VOC	Volatile Organic Compounds
VwVwS	German Administrative Regulation on the Classification of Substances Hazardous to Waters into Water Hazard Classes
WGK	German Water Hazard Class
WHO	World Health Organization