SAFETY DATA SHEET (SDS)

mesoC+™ (C)

According to Regulation EC 1907/2006 (REACH)

Version 4 Revision Date: 2020-09-08 Supersede version: 2018-02-09

SECTION 1: IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

1.1. Product identifier

This product is considered as a substance

Name:	Mixture of Activated Carbon-High Density Skeleton and Carbon black
Trade Name:	mesoC+™
EC / List no.:	931-328-0 and 215-609-9
CAS no.:	7440-44-0 and 1333-86-4
REACH Registration number:	01-2119488894-16-0078 and 01-2119384822-32-0169
Description:	Carbon Extrudates, Grains, Spheres. With particle size > 50µm

1.2. Relevant identified uses of the substance and uses advised against

Identified Use: Catalyst support.

No uses advised against identified.

1.3. Details of the supplier of the safety data sheet

Manufacturer name and identification:

ACM GmbH
Industriestraße 1, B310
77731 WILLSTÄTT
Phone : +49 (0) 7852 8 1150

Contact Persons responsible for the SDS: e-mail: info@acmgmbh.com

1.4. Emergency telephone number

National Poisons Information Service: Available 24 hours a day, 365 days a year

http://echa.europa.eu/help/nationalhelp_contact_en.asp

SECTION 2: HAZARDS IDENTIFICATION

2.1.Classification of the substance

MesoC+™ carbon is not classified as hazardous substance according to CLP criteria (Regulation EC No 1272/2008).

2.2. Label elements

No labelling required for mesoC+™ carbon according to CLP criteria (Regulation EC No 1272/2008).

2.3. Other hazards

MesoC+™ carbon does not fulfil PBT or vPvB criteria (REACH annex XIII).

According to ACGIH mesoC+™ carbon is insoluble or made of poorly soluble particles not otherwise specified (PNOS).

As Carbon Black is stabilized by its combination with Activated Carbon – High density skeleton in a macroscopic shape (extrudates, grains, spheres with particle size > 50µm), it is no more present as free respirable dust.

ACM recommends limiting dust's formation during handling and storage (see sections 7 and 8 for more advices).

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substance

mesoC+™ carbon is considered as a mixture according to ECHA guidance "Identification and naming of substances under REACH and CLP".

Designation	Classification according to CLP criteria	Concentration (w/w)
Carbon Black Formula: C CAS -No: 1333-86-4 CE -No: 215-609-9 INDEX -No: NA	Not classified.	20-80 %
Activated Carbon – High Density Skeleton Formula: C CAS -No: 7440-44-0 CE -No: 931-328-0 INDEX -No : NA	Not classified.	20-80 %
	Total	**100 %**

SECTION 4: FIRST AID MEASURE

4.1. Description of first aid measures

General advice: IN CASE OF SEVERE OR PERSISTENT DISTURBANCES, CALL A DOCTOR OR SEEK EMERGENCY MEDICAL HELP. Show the safety data sheet if possible. Take care to self-protect by avoiding becoming contaminated.

Skin contact: Not expected to present a significant skin hazard under anticipated conditions of normal use, but, if irritation or rash occurs:

1) Take off all contaminated clothing and shoes.
2) Immediately flush affected area with plenty of soap and water – continue for at least 10 minutes.
3) If there are signs of irritation or other symptoms seek medical attention.

Wash clothing before reuse.

Eye contact: Before any action on a par with eyes, wash your hands with soap and water to avoid any risk of infection.

1) Flush eyes with water thoroughly and continuously for at least 15 minutes.

Rinse instructions:
Remove any contact lenses.
Keep eye wide open while rinsing.
Continue rinsing.
Protect unharmed eye. Avoid splashing.
Water flow always from the nose to the ear.
Move the eye in all directions.

2) Once done rinse, cover the eye with a compress.

3) If eye irritation, pain, swelling, lachrymation or photophobia persists, consult a physician, preferably an ophthalmologist.

If swallowed: Not expected to present a significant ingestion hazard under anticipated conditions of normal use. Do not induce vomiting unless if this is indicated by the physician or Poison Center. Do not give milk or alcoholic beverages.

1) If conscious, give several glasses of water.

2) Get medical attention immediately

3) When vomiting occurs spontaneously, make the body leaned to prevent from inhaling to the bronchus.

4) Never give anything by mouth to an unconscious person.

If inhaled: If dust is inhaled, and if symptoms of pulmonary involvement develop:

1) Remove from exposure and move to fresh air immediately.
2) Ensure good air circulation. Remove anything that could be tightened, like a collar, a tie, a belt or a girdle.
3) If breathing is difficult, give oxygen if possible or assisted ventilation, (do not use mouth to mouth).
4) If unconscious, place in recovery position.
5) Get medical aid

4.2. Most important symptoms and effects, both acute and delayed

MesoC+™ is a mechanical irritant, prolonged contact may cause skin abrasion and may cause tearing and redness.

If dust is inhaled, any symptoms of pulmonary involvement may be developed (coughing, wheezing, or shortness of breath).

The most important known symptoms and effects are described in Section 11.

4.3.Indication of any immediate medical attention and special treatment needed

No specific treatment required. Treat symptomatically.

SECTION 5: FIRE FIGHTING MEASURES

5.1. Extinguishing media

General information	It may not be obvious that carbon black is burning unless the material is stirred and sparks are apparent. MesoC+™ that has been on fire should be observed closely for at least 48 hours to ensure no smoldering material is present. Carbon blacks containing more than 8% volatile materials may form an explosive dust-air mixture. MesoC+™ do not exceed 8% volatile materials content.
Suitable extinguishing media	• ABC dry chemical • Alcohol-resistant foam, • CO_2, • Water fog

Extinguishing media not to be used for safety reasons	Careful! Unlike sprays, powerful jets can disperse the firebox and aggravate the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

5.2. Special exposure hazards arising from the substance

Carbon monoxide (CO), Carbon dioxide (CO_2), Sulphur oxides.

5.3. Protective Equipment and Precautions for Firefighters

Wear an approved positive pressure self-contained breathing apparatus in addition to standard firefighting gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1.Personal precautions, protective equipment and emergency procedures

Limit dust formation, ensure adequate ventilation. Use personal protective equipment.

See section 8.

6.2.Environmental precautions

mesoC+™ 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

Vacuum or sweep up material and place into a suitable disposal container. A vacuum equipped with HEPA (high efficiency particulate air) filtration is recommended. Clean up spills immediately, observing precautions in the Protective Equipment section.

Avoid generating dusty conditions. Provide ventilation.

6.4.Reference to others sections

Refer to Section 8 for PPE

Refer to Section 4 for FIRST AID MEASURES

Refer to Section 5 for FIRE-FIGHTING MEASURES

Refer to Section 13 for DISPOSAL CONSIDERATIONS

SECTION 7: HANDLING AND STORAGE

Advices relating to storage premises apply to workshops where the product is handled. Risk management measures should be adapted to the operating conditions in accordance with product's exposure conditions (if dispersive use, amount used, frequency, containment level ...)

Storage: Keep separated from oxidizing substances, unsaturated oils, metal salts, easily absorbable gases or vapours, sources of direct heat or naked flames and direct sun light.

ACM highly recommends limiting dust's formation during handling and storage.

7.1. Precautions for safe handling

Hygiene measures:

- Avoid contact with skin and eyes.
- Smoking, eating and drinking should be prohibited.
- Keep working clothes separately from street clothes.
- Do not wear work clothes soiled in places such as offices, meeting rooms, relaxation areas, company restaurants or cafeterias.
- Do not leave the property with work clothes or personal protective equipment.
- Wash contaminated clothing before reuse (Note that the leather or other porous materials cannot be cleaned: once contaminated, they should be disposed of as chemical waste).
- Wash thoroughly after handling this product and before breaks.
- Always wash up before eating, smoking or using the facilities
- If necessary, take a shower after working.

Organizational measures:

- Training and information for workers
- Search for safer products or processes less exponents
- Limit working time for workers exposed
- Establish a procedure for chemical purchases (taking into account quantities and packaging)
- Managing the flow and storage of chemicals (unnecessary inventory, limiting the quantities stored ...)
- Waste Management (Do not use empty container before they have been cleaned).

- Establish Routine maintenance of facilities
- Restricting access to local

Additional specific measures to inhalation risk:

- Provide adequate local ventilation (10 to 15 air volume / hour). Use only in a well-ventilated area
- Avoid dust formation
- Reduce friction and impact between crude and grains
- It is recommended to work in an engineered closed system where respirable dust may be exhausted.
- When dispersed in water, solvent, polymer, or other carrier material (when wetted), mesoC+™ dust is non-respirable and non-hazardous.

7.2. Conditions for safe storage, including any incompatibilities

Conditions of storage rooms and vessels	Storage in dry area and in a sealed container. Keep container closed where possible. Avoid dust generation. Identify the contents of all 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.
Advice of storage of incompatible materials	Keep away from ignition sources and strong oxidizers.
Further information of storage	None

7.3. Specific end use(s)

Apart from the uses mentioned in SECTION 1.2, no other specific uses are stipulated.

SECTION 8: EXPOSURES CONTROL / PERSONAL PROTECTION

8.1.Exposure limits

Exposure limits: Ingredients with workplace control parameters

Substance	**Carbon Black**	
CAS No.	**1333-86-4**	
Remarks		
	Limit value - Eight hours	**Limit value - Short term**
Australia	3 mg/m^3	
Belgium	3.5 mg/m^3	
Canada - Ontario	3 mg/m^3 (1)	
Canada - Québec	3.5 mg/m^3	
Denmark	3.5 mg/m^3	7.0 mg/m^3
Finland	3.5 mg/m^3	7 mg/m^3 (1)
France	3.5 mg/m^3	
Ireland	3.5 mg/m^3	7 mg/m^3 (1)
Israel	3.5 mg/m^3 (1)	
Japan-JSOH	1 mg/m^3 (1) 4 mg/m^3 (2)	
New Zealand	3 mg/m^3	
People's Republic of China	4 mg/m^3 (1)	
Singapore	3.5 mg/m^3	
South Korea	3.5 mg/m^3	
Spain	3.5 mg/m^3	
Sweden	3 mg/m^3	
United Kingdom	3.5 mg/m^3	7 mg/m^3
USA - NIOSH	3.5 mg/m^3 (1)	
USA - OSHA	3.5 mg/m^3	

Remarks:
Canada - Ontario: (1) This value is for inhalable fraction
Finland: (1) 15 minutes average value
Ireland: (1) 15 minutes reference period
Israel: (1) inhalable fraction
Japan – JSOH: (1) Respirable dust (2) Total dust comprises particles with a flow speed of 50 to 80 cm/s at the entry of a particle sampler.
People's Republic of China: (1) Inhalable fraction
USA-NIOSH: (1) in presence of PAHs: limit PAHs to 0.1 mg/m^3 TWA (detected as cyclohexane soluble extract)

Substance	**Activated Carbon – High Density Skeleton**	
CAS No.	-	
Remarks		
	Limit value - Eight hours	**Limit value - Short term**
USA - NIOSH	None	
USA - OSHA	None	
USA - ACGIH	TWA-2.5 mg/m^3 as reparable dust	

DN(M)EL

The derived no- or minimum effect level (DN(M)EL) is the level of exposure above which a human should not be exposed to a substance. Please note that when more than one summary is provided, DN(M)EL values may refer to constituents of the substance and not to the substance as a whole. More detailed information is available in the REACH Registration dossiers.

SUBSTANCE	TARGET	EXPOSURE	MOST SENSITIVE STUDY	DNEL
Carbon Black CAS No. 1333-86-4	workers	inhalation	Repeated dose toxicity	2 mg/m³
	general population	inhalation		No hazard identified
		dermal		
		oral		
Activated Carbon – High Density Skeleton CAS No.-	workers	inhalation	-	No hazard identified
	general population	inhalation		
		dermal		
		oral		

Predicted No-Effect Concentration (PNEC)

PNEC aqua (freshwater and marine water): 5 mg/L.

8.2.Exposure controls

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Use personal protective equipment properly maintained. You must inspect protections before each use. Keep personal protective equipment in a clean place away from the work area.

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Eye/face protection:

It is recommended to contact lens wearers to use corrective lenses. Use safety glasses with side shields or goggles recommended as matter of good practice.

Skin protection:

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

Respiratory protection:

Avoid inhaling the dust; if in specific circumstances, compliance cannot be achieved, use a disposable (P3) dust protection mask.

Thermal hazards: No

Environmental exposure controls: No special measures required.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Unless otherwise indicated, tests were carried out at 20 °C and at normal atmospheric pressure.

9.1 Physical and chemical properties

Physical state:	Solid
Colour:	Black
Odour:	Odourless.
Odor Threshold:	Not applicable.
pH:	2.5 – 10
Boiling point:	Not applicable.
Melting point:	Not applicable.
Flash point:	Not applicable.
Evaporation rate:	Not applicable.
Flammability:	No information available.
Solubility:	Insoluble in water, solvents and acids.

Participation coefficient n-octanol/water: Not applicable

Vapor Pressure:	Not applicable.
Explosive limits:	Not applicable.
Density:	1.5 to 1.9 g/cm^3
Bulk density:	From 0.1 to 1.9 g/cm^3.
Decomposition temperature:	Not applicable.
Viscosity, dynamic:	Not applicable.
Oxidizing properties:	Not applicable.
Explosive properties:	Dust may form explosive mixture in air.

9.2 Other information

Miscibility: Not determined for the substance

Conductivity: Not determined for the substance

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

None under normal processing. No hazardous reactions known.

10.2. Chemical stability

This material is stable.

10.3. Possibility of hazardous reactions

No hazardous reactions known under normal processing.

10.4. Conditions to Avoid

It should not be mixed with strong oxidant agents and keep away from heat and sources of ignition. Avoid dust formation.

10.5. Incompatible Materials

Strong oxidant agents.

10.6. Hazardous Decomposition Products

Carbon monoxide (CO). Carbon dioxide (CO_2). Sulfur oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

All information provided below refers to the public available information in Carbon Black and Activated Carbon – High Density Skeleton REACH registration dossier.

a) Acute toxicity:

Route of Exposure: Inhalation

Carbon Black

Test: Effect level > 4.6 mg/m^3 air (4h) - Routes of Exposure: Inhalation – species: Wistar rats from Charles River, Quebec, Canada
Bibliographic source: Research Report no. 104: Health Effects Institute. October 2001.
Executive summary: no detected mortality or signs of toxicity
Interpretation of results: not classified

Activated Carbon – High Density Skeleton

Test: OECD Guideline 403 (Acute Inhalation Toxicity)
Executive summary: This acute inhalation toxicity study in rats was conducted according to a method resembling OECD guideline 403. Male and female rats were exposed for one hour to BPL 12 x 30 at a nominal concentration of 64.4 mg/L and a mean airborne concentration of 8.5 mg/L. Rats were observed for 14 days after exposure. Several effects were observed. All rats appeared heavily contaminated with the test material during and 14 days after the exposure period. Animals visible exhibited labored breathing and intermittent gasping. Upon removal from the chamber mucoid nasal discharge, salivation, rapid or labored breathing, gasping, dry or moist rales, reduced activity, and wet or matted ano-genital fur were observed. Recovery was apparent within 1 day. Slight dry rales was observed in most rats during the 14-day observation period. Weight losses were seen in nearly all rats following exposure. Body weights recovered to pre-exposure values in males by day 4 and in females usually by day 7. Body weights in the second week were within the limits of normal expectation. At necropsy, 5 male and 4 female rats showed foci or areas of lung discoloration. As no deaths occured the tested concentration can be considered as LC0 (LC50 >8.5 mg/L). Following these results, the test substance does not need to be classified for acute inhalation toxicity according to the criteria outlined in Annex I of 1272/2008/EC.
Interpretation of results: GHS criteria not met

Route of Exposure: Oral

Carbon Black

Study generated according to internationally accepted testing guidelines. (OECD Guideline 401)
Test: DL50 - Routes of Exposure: Oral – species: Rat - NOAEL: > 10 000 mg/kg bw
According to an acute oral toxicity test conducted with Carbon Black (Printex 140), not specified further, it can be stated that the substances shows no clinical signs of toxicity. The oral LD_{50} in rats was determined to be > 10000 mg/kg body weight.
Interpretation of results: GHS criteria not met

Activated Carbon – High Density Skeleton

Test was conducted according to OECD Test Guideline No. 423, 2001, under GLP Standards, and QA.

Executive summary: The acute oral toxicity of Steam Activated Carbon in the rat was assessed by using the acute toxic class method. The study was carried out based on OECD guideline 423. Two groups, each consisting of three female RccHan:WIST (SPF) rats, were treated with Steam Activated Carbon by single oral gavage administration at a dosage of 2000 mg/kg body weight. The test item was formulated in purified water at a concentration of 0.2 g/mL and administered at a dosing volume of 10 mL/kg. No intercurrent deaths occurred during the course of the study. Clinical signs of slight to moderate degree were observed in the animals of group 1, including hunched posture and ruffled fur. All symptoms were completely reversed by test day 3. No clinical signs were observed in the animals of group 2. For all animals, black feces were noted on test day 2, which was most likely a consequence of the black test item. The body weight of the animals was within the range commonly recorded for this strain and age. No macroscopic findings were recorded at necropsy. The median lethal dose of Steam Activated Carbon after single oral administration to female rats, observed over a period of 14 days, is: LD50 (female rat): greater than 2000 mg/kg body weight. The substance does not have to be classified according to the EU classification criteria outlined in 1272/2008.

Conclusions: No treatment related effects were found under the conditions of this study. The median lethal dose of Steam Activated Carbon after single oral administration to female rats, observed over a period of 14 days, is: LD50 (female rat): greater than 2000 mg/kg body weight. The substance does not have to be classified according to the EU classification criteria outlined in 1272/2008.

Route of Exposure: Skin contact

No data available

b) **Skin corrosion/irritation**

Carbon Black

Study generated according to internationally accepted testing guidelines. (OECD Guideline 404)
Methods: in vivo - species: albino Rabbit - Duration of exposure: 24 h
Primary Dermal Irritation Index (PDII) – Score = 0 (Time point = 120 h)
Erythema – Score = 0 (Time point = 24, 48, 72 and 120 h)
Edema – Score = 0 (Time point = 24, 48, 72 and 120 h)
Interpretation of results: The substance is not a skin irritant. None of the animals exhibited any signs of skin irritation (no edema, no erythema at any of the observations).

Activated carbon – High Density Skeleton

Study generated according to internationally accepted testing guidelines. (OECD Guideline 404)
Executive summary: The skin irritating potential of activated carbon was assessed in multiple studies (5 samples of activated carbon) in rabbits (OECD 404). Animals were exposed for 4 hours and observed thereafter for 72 hours (at 1, 24, 48 and 72 hours after removal of test substance). Three rabbits were used per study, every animal was its own control (other flank of the animal). The studies showed no erythema or oedema effects after the application of activated carbon within 72 hours. In 4/5 studies grey discolouration of the treated skin was seen. In most individual cases this effect was reversible within 72 hours. Therefore, the test substance does not need to be classified as skin irritant according to the the EU criteria outlined in Annex I of 1272/2008/EC.
Conclusions: The studies assessed the irritating potential of activated carbon in rabbits (OECD 404 test). No erythema or oedema effects were observed, indicating that activated carbon can be considered as a non-irritant to skin under the conditions of the tests. This was based on the criteria outlined in Annex I of 1272/2008/EC.

c) Serious eye damage/irritation

Carbon Black
Study generated according to internationally accepted testing guidelines. (OECD Guideline 405)
Methods: in vivo - species: albino Rabbit - Exposure: 100 mg of the test substance was instilled into the left eye. The other eye was treated with physiological saline solution and served as control. The eyes were not rinsed.
Cornea opacity – Score = 0 (Time point = 24, 48, 72 h)
Iris – Score = 0 (Time point = 24, 48, 72 h)
Conjuctivae – Score = 0 (Time point = 24, 48, 72 h)
Chemosis – Score = 0 (Time point = 24, 48, 72 h)
Interpretation of results: The substance is not an eye irritant. No irritant effects were found in any of the animals at any observation.

Activated carbon – High Density Skeleton

Study generated according to internationally accepted testing guidelines. (OECD Guideline 405)
Conclusions: The test item did not induce significant or irreversible damage to the rabbit eye. Based on these results and according to the EU criteria outlined in Annex I of 1272/2008/EC (CLP/EU-GHS), Steam Activated Carbon does not have to be classified and has no obligatory labelling requirement with respect to eye irritation in rabbits.

d) Skin sensitization

Carbon black

Study generated according to internationally accepted testing guidelines. (OECD Guideline 406)
Methods: in vivo - species: Guinea Pig Skin - Exposure: epidermal induction with 50% of the test material in sterile water; epidermal challenge with 50% of the test material in sterile water Reading: Hours after challenge: 24.0. Group: test group. Dose level: 50% in sterile water. No with. + reactions: 0.0. Total no. in groups: 20.0. Clinical observations: dark coloration at treated sites. Hours after challenge: 48.0. Group: test group. Dose level: 50% in sterile water. No with. + reactions: 0.0. Total no. in groups: 20.0. Clinical observations: dark coloration at treated sites. Interpretation of results: The substance is not sensitising. Carbon Black XPB 295 was not sensitising in guinea pigs (Buehler test performed according to OECD guideline 406)

Activated carbon – High Density Skeleton

Study generated according to internationally accepted testing guidelines. (OECD Guideline 429- Skin Sensitisation: Local Lymph Node Assay)
Conclusions: Under the conditions of this study, steam activated carbon did not induce sensitisation in the mouse. The highest SI calculated was 2.85, which is below the threshold of 3 for classification. Therefore, the test substance does not need to be classified for sensitisation based on the criteria outlined in Annex I of 1272/2008/EC.

e) Respiratory sensitization

Carbon black

Test: Effect level > 4.6 mg/m^3 air (4h) - Routes of Exposure: Inhalation – Materials: ultra-fine carbon black - species: Mouse
Bibliographic source: Research Report no. 104: Health Effects Institute. October 2001.
Methods: Mice were intranasally exposed to ovalbumin (OVA) alone or in combination with ultrafine carbon black particles. The induction of airway inflammation and the immune adjuvant activity were studied in the lungs and lung-draining peribronchial lymph nodes (PBLN) at day 8. OVA-specific antibodies were measured at day 21, and the development of allergic airway inflammation was studied after OVA challenges (day 28).

Interpretation of results: Not sensitising. Ultrafine (below 30 nm in diameter) but not fine (over 200 nm in diameter) carbon black particles (200 µg) induced airway inflammation and displayed adjuvant activity. The latter was evidenced by the induction of immune sensitization to co-administered ovalbumin and demonstrated by increased levels of cytokines associated with a Th2 immune response and by the occurrence of allergic airway inflammation after an intranasal OVA challenge. A systemic antibody response was not detected.

f) Germ cell mutagenicity

Carbon Black

Test: In vitro - Study generated according to internationally accepted testing guidelines. (OECD Guideline 471)

Executive summary: In order to investigate the potential of Printex 70 to induce gene mutations in bacteria, the plate incorporation test (experiment I) and the pre-incubation test (experiment II) were performed in Salmonella typhimurium strains TA1535, TA1537, TA98, TA100 and in E. coli strains WP2 and WP2uvrA. Printex 70 was Soxhlet extracted with toluene and the residue taken up in DMSO. The extract was tested with and without metabolic activation (S9 mix) in triplicate at the following concentrations: 100, 80, 60, 50, 40 and 10%. No cytotoxicity was observed up to the highest concentration tested. No increase in revertant frequencies was detected in any of the tester strains at any dose level either with or without metabolic activation. (Increases in revertant frequencies were always below a factor of 2 as compared to the controls). The positive controls were functional.
Conclusions: Interpretation of results (migrated information):
Negative with metabolic activation in all Salmonella and E. coli strains tested
Negative without metabolic activation in all Salmonella and E. coli strains tested
Printex 70 toluene extract did not induce an increase in mutation frequency in any of the tester strains with and without metabolic activation.

Test: In vivo - Duration of exposure: 13 weeks - Routes of Exposure: Inhalation – species: Rat
Bibliographic source: Toxicology and Applied Pharmacology, 205 (2), 157-167.
Methods: F344 rats were exposed by inhalation for 13 weeks and then DNA was extracted from whole lung DNA immediately after exposure. The lungs of the rats for DNA analysis were not lavaged but the vascular system was perfused. DNA was extracted and used to determine oxidative DNA damage. To determine whether PAHs were available and subsequently transformed into DNA-binding metabolites, lungs of three animals from each exposure group were analysed for DNA adducts, immediately after exposure.
Note: A series of in vitro experiments were conducted alongside an in vivo study, which showed that PAHs are very tightly bound to carbon blacks.
Interpretation of results: (migrated information): negative (DNA adducts)
No adducts were found in DNA from lung homogenates isolated immediately after 13 weeks of inhalation of up to 50 mg/m3 of Printex 90 and Sterling V, which resulted in lung burdens of 4.9 mg and 7.6 mg, respectively. Although the lung burden was significantly lower than lung burden following a six or 24 month inhalation period, Sterling V contains at least 1000-fold the amount of PAHs compared with Printex 90. Lung DNA from rats following inhalation of carbon black showed no spots relating to PAH-DNA adduct formation compared to sham-exposed animals.

g) Carcinogenicity

Carbon Black

Studies conducted in rats have demonstrated that chronic inhalation of high doses of carbon black results in increased pulmonary inflammation, adenomas and carcinomas in the peripheral rat lung. This response is generally referred to as an overload response or threshold effect. The hypothesis that a threshold effect is relevant to the tumor response in rats is supported by data from numerous studies indicating that at exposure levels below that which causes a persistent inflammatory response, tumors are not produced. Substantial data also indicates the involvement of secondary processes, such as inflammation and inflammatory-induced oxidative stress, as possible mechanisms for the rat lung tumor response. Furthermore, recent studies have highlighted the impact of particle size and surface area on these processes.

h) Reproductive toxicity

Carbon black has not been tested in a study for its effect on reproduction. Based on the available information on toxicokinetics and metabolism, repeat dose toxicity and developmental toxicity it is very unlikely that the substance will reach the reproductive organs in vivo. No adverse effects on the reproductive function are expected.

i) Target Organ Effects - single exposure (STOT SE)

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

j) Target Organ Effects - repeated exposure (STOT RE)

Repeated dose toxicity: oral

Routes of Exposure: oral
Bibliographic source: The effect of **carbon black** ingestion on 1,2-dimethylhydrazine- induced colon carcinogenesis in rats and mice. Toxicol. Lett., 25, 273-277
Conclusions: Carbon black is not classified as target organ toxicant via oral exposure route.
Executive summary: Survival of mices is not affected by repeated oral absorption of carbon black. No tumour incidence.

Repeated dose toxicity: inhalation

Carbon Black

Routes of Exposure: inhalation – species: rat, mouse, hamster
Bibliographic source: Toxicological Sciences 88(2), 614-629
Conclusions: The results show that hamsters have the most efficient clearance mechanisms and least severe responses of the threee species tested. The results from rats also showe that particle surfae area is an important determinant of target tissue dose and, therefore, effects. From these results, a subchronic NOAEL of 1 mg/m3 respirable HSCb (Printex 90) can be assigned to female rats, mice, and hamsters.
Executive summary: Particle retention kinetics, inflammation, and histopathology were examined in female rats, mice, and hamsters exposed for 13 weeks to high surface area Cb (HSCb) at doses chosen to span a no observable adverse effects level (NOAEL) to particle overload (0, 1, 7, 50 mg/m3, nominal concentrations). Rats were also exposed to low surface area Cb (50 mg/m3, nominal; LSCb). Retention and effects measurements were performed immediately after exposure and 3 and 11 months post-exposure; retention was also evaluated after 5 weeks of exposure. Significant decreases in body weight during exposure occurred only in hamsters exposed to high-dose HSCb. Lung weights were increased in high-dose Cb-exposed animals, but this persisted only in rats and mice up to the end of the study period. Equivalent or similar mass burdens were achieved in rats exposed to high-dose HSCb and LSCb, whereas surface area burdens were equivalent for mid-dose HSCb and LSCb. Prolonged retention was found in rats exposed to mid- and high-dose HSCb and to LSCb, but LSCb was cleared faster than HSCb. Retention was also prolonged in mice exposed to mid- and high-dose HSCb, and in hamsters exposed to high-dose HSCb.

Lung inflammation and histopathology were more severe and prolonged in rats than in mice and hamsters, and both were similar in rats exposed to mid-dose HSCb and LSCb. The results show that hamsters have the most efficient clearance mechanisms and least severe responses of the three species. The results from rats also show that particle surface area is an important determinant of target tissue dose and, therefore, effects. From these results, a subchronic NOAEL of 1 mg/m3 respirable HSCb (Printex 90) can be assigned to female rats, mice, and hamsters.

Activated carbon – High Density Skeleton

OECD Guideline 413 (Subchronic Inhalation Toxicity: 90-Day Study)
Conclusions: In a sub-chronic toxicity study performed in accordance with OECD 413 and under GLP conditions, male and female rats were exposed to Activated Carbon – High Density Skeleton (AC-HDS) for 13 weeks, 6 hours per day and 5 days per week, nose-only. A NOAEL of 7.29 mg/m3 (actual concentration) was observed based on slight lung inflammatory changes based on increased pulmonary neutrophils in the high-dose group (10.25 mg/m3, actual concentration).
Executive summary: In a sub-chronic toxicity study performed in accordance with OECD 413 and under GLP conditions, male and female rats were exposed to Activated Carbon – High Density Skeleton (AC-HDS) for 13 weeks, 6 hours per day and 5 days per week, nose-only. Exposure concentrations were 3.33, 7.29, and 10.25 mg/m3(actual concentrations), and a control group that was exposed to clean air was included. The dose concentrations approximately correspond to daily doses of 0, 0.18, 0.39 and 0.55 mg/kg body weight/day. The 90-day study was preceded by a 14-day Dose Range finding study in which male and female rats were exposed to AC-HDS for 2 weeks, 6 hours per day and 5 days per week, nose-only. Exposure concentrations were 3.1, 10.8, and 30.4 mg/m3(actual concentrations). A control group was exposed to clean air.
No treatment related clinical abnormalities, ocular changes, effects on body weight, food consumption, and estrus cycle were observed during the study. Furthermore, no treatment-related effects on hematology, clinical chemistry, and sperm parameters were observed. The only observed effect was minimal lung inflammation at the lowest dose, as indicated by minimal, but statistically significant increases in biochemical and cellular parameters in bronchoalveolar lavage fluid. These effects are confirmed microscopically by more active alveolar macrophages, which remained however within the normal physiological range. The study pathologist concluded that: "the microscopic findings show a normal physiological response of the animals by macrophages attempting to clear the particles from the respiratory tract". The observed microscopic change in alveolar macrophages is therefore considered physiological and not pathological. Based on the absence of other indications of lung toxicity (e.g. cytotoxicity and histopathological changes), it seems justified to consider the observed increased macrophage-mediated response to inhaled respirable AC-HDS as a physiological response of little, if any, toxicological significance. As effects were observed at all concentration levels, no NOEL was established in the study report.

The LOEL was 3.33 mg/m3 for male and female rats in the study report. However, based on comparison with other sub-chronic inhalation studies in rats with a similar inert particulate test substance in which lung particle overload was studied, it can be concluded that the 3.33 mg/m3 and 7.29 mg/m3 dose levels are most probably below the threshold for lung particle overload, hence covering a dose range relevant for extrapolation to human hazard. Furthermore, no pulmonary cytotoxicity is seen at the 3.33 mg/m3 and the 7.29 mg/m3 dose levels and the very slight lung inflammatory changes based on minimal increases in pulmonary neutrophils seen at the 3.33 mg/m3 and 7.29 mg/m3 dose levels are considered responses within the normal physiological range. Based on the above the NOAEL for AC-HDS is considered to be 7.29 mg/m3.

Repeated dose toxicity: dermal

Carbon Black

Routes of Exposure: dermal – species: mouse
Bibliographic source: A.M.A. Arch. Industr. Health 18, 511-520.
Executive summary: In this study with limited documentation, no changes in organs or tissues of C3H mice were found after treating them three times per week with various types of carbon blacks (20% carbon black suspensions in cottonseed oil, mineral oil or in 1% aqueous carboxymethylcellulose, painted onto the animals' backs) for 12 -18 months.
Methods: Carbon blacks were suspended in mineral oil, cottonseed oil, cooking oil or water with 1% carboxymethyl cellulose. The backs of the test animals were painted with a brush three times per week with 20% emulsions of the designated carbon blacks, benzene extracts thereof or extracted carbon black for 12-18 months.
Additional groups were treated with known carcinogens (methylcholanthrene, 3,4-benzpyrene). The negative controls were treated with the corresponding vehicle.
Conclusions: Carbon blacks as manufactured produce no significant changes from the normal following skin contact. Carbon blacks have adsorbed components which, when free, and applied to the skin of mice, produce skin cancer. The adsorbed components, however, are ineffective as a carcinogen. Carbon blacks can adsorb effectively known carcinogens such as methylcholanthrene and 3,4-benzpyrene and by such adsorption do eliminate or reduce the carcinogenicity of these substances.

k) Aspiration Hazard

No data available.

11.2. Other adverse effects

Exposure related observations in humans (Carbon Black):

Health surveillance Data

J Occup Health 53: 432–438

Symptoms of Respiratory Disease and Lung Functional Impairment Associated with Occupational Inhalation Exposure to Carbon Black Dust

Conclusions: Cough and wheezing were higher in the exposed group (72 workers in the rubber industry; 23.6% vs. 1.44% and 25% vs. 1.44, respectively). In this study, the exposure assessment methodology is unclear, as no details of basic sampling strategy (area, personal, production conditions, etc.) were provided. Thus, results from high exposure to any type of dust, whether reactive or inert, would likely cause these results.

Executive summary: A cross sectional morbidity assessment was designed to assess and characterise pulmonary reactions, if any, associated with occupational exposure to carbon black, among a group of rubber workers.
Participants included 72 workers from the warehouse, loading, and Banbury areas and 69 controls from the plant. Symptoms were assessed by a questionnaire and pulmonary function tests. Exposure assessment included inhalable and respirable factions. Cough and wheezing were higher in the exposed group (23.6% vs. 1.44% and 25% vs. 1.44, respectively). In this study, the exposure assessment methodology is unclear, as no details of basic sampling strategy (area, personal, production conditions, etc.) were provided. Nonetheless, the exposures were excessive. Reported concentrations were 5-6 times higher than current North American inhalable exposures in the carbon black industry. Thus, results from high exposure to any type of dust, whether reactive or inert, would likely cause these results. In this study, (1) exposures were significantly above past and current OELs; (2) there was an absence of engineering controls, maintenance, work practices, employee training, industrial hygiene activities; and (3) there was no respiratory protection.

Epidemiological Data

Am. J. Ind. Med. 50, 555–564

A ‘‘Lugged’’ Analysis of Lung Cancer Risks in UK Carbon Black Production Workers, 1951–2004
Details on study design: The mortality of a cohort of 1,147 male manual workers from five UK factories manufacturing carbon black was investigated for the period 1951–2004. All subjects were first employed in the period 1947–74 and were employed for 12 months or more. Limited work histories were available to calculate estimates of individual cumulative exposure to carbon black.
Conclusions: The findings suggest that carbon black, or chemicals associated with the production of carbon black, had an effect on later stages of lung cancer carcinogenesis at two of the plants but that no such effect was found at the other plants.

Based on serial rates for the general population of England and Wales, significantly elevated mortality was observed for lung cancer (Obs 67, SMR 146, P<0.01) but not for all other causes combined (Obs 426, SMR 106). There was highly elevated lung cancer mortality at two of the plants (SMR 230, Obs 35) but no excess mortality at the other three plants combined (SMR 104, Obs 32). Analyses by period since leaving employment indicated elevated lung cancer risks were limited to those workers with some employment in the most recent 15 years. SMR analyses found an overall positive significant trend between lung cancer risks and cumulative carbon black exposure received in the most recent 15 years. Poisson regression analyses provided different results depending on which variables were adjusted for.

Direct observations: clinical cases, poisoning incidents and other

Klin. Mbl. Augenheilk. 177, 829-831
Problems arising from the use of cosmetics on the lid margin [in German]
Clinical signs:
This paper reports on clinical and histopathological changes of the conjunctiva after long-term use of cosmetics containing carbon black (mascara, eyeliner) on the lid margin. Penetration of tiny pigmented particles into the stroma of the conjunctiva initially causes a follicular reaction which is evidently toxic, and later, results in a chronic follicular-papillary reaction.

Other Data

J. Occup. Environ. Med. 45 (2), 131-143 and J. Occup. Environ. Med. 45, 144-155

A Triangulation Approach to Historical Exposure Assessment for the Carbon Black Industry & Effect of Carbon Black Exposure on Respiratory Function and Symptoms

Details on study design: Carbon black production employees (1755) participated in the third round of the industry-wide medical surveillance testing. They were employed in 22 North American plants. Spirometry and a systematically administered questionnaire were included in the year 2000 round of the industry-wide medical surveillance program. Industrial hygiene data from an industry-wide survey in 2000-2001, as well as all available exposure assessment data collected since 1979, were integrated with process questionnaires and exposure rating questionnaires completed by plant personnel. Analyses included multiple linear regression and categorical data analyses.

Conclusions: Multiple regression analyses showed statistically significant, consistent relationships between cumulative exposusre and small reductions in forced expiratory volume in 1 second (FEV1) but not with other spirometry parameters. The estimated slopes were - 2 mL FEV1 per mg-year/m^3 of cumulative "total" dust exposure and - 0.7 mL FEV1 per mg-year/m^3 of cumulative exposure for the inhalable fraction. In addition, heavy cumulative exposures were associated with a small increase in chronic bronchitis in nonsmokers. Recent exposures, typically much lower than in the past, were not demonstrated to be associated with these effects.

Table 6 of Harber et al. (J Occup Environ Med 45, 144-155, 2003) describes elevated prevalence of symptoms (chronic bronchitis) in the highest exposure pentile which is comparable to an exposure to inhalable dust of 138 mg*years/m^3 or to an average concentration over 40 years of exposure at (138 mg*years/m^3)/(40 years) = 3.5 mg/m^3. A no observed adverse effect level (NOAEL) may be derived from the same table because up to the third pentile of cumulative exposure, no excess risk can be detected. This approach is conservative because the authors applied no age adjustment. Applying Table 6 of Harber et al. 2003 the NOAEL can be estimated at (3/5) *3.5 mg/m^3 = 2 mg/m^3 (inhalable).

SECTION 12: ECOLOGICAL INFORMATION

All information provided below refers to the public available information in Carbon Black and Activated Carbon – High Density Skeleton REACH registration dossier.

12.1. Aquatic toxicity - Component Information

Activated carbon – High Density Skeleton

As the test substance does not dissolve in water, the mechanism of partitioning from the water phase and thus uptake by diffusion from the water phase does not take place. Thus, exposure of sediment organisms to the test substance may occur only by oral intake of solid particles of the test substance. An effect in the organism would then be caused by internal partitioning of test substance (as modelled by equilibrium partitioning and for highly lipophilic substance with an additional factor of 10, see Guidance Document on Information Requirements and Chemical Safety Assessment R.10 and R.16). However, for activated carbon no absorption is expected (see toxicokinetic assessment). The absence of effects from oral intake of activated carbon is supported by the results of an acute toxicity study with rats where no adverse effects were observed after oral exposure to 2000 mg/kg (C80453). Thus there seems to be no justification in testing the effects of oral exposure of soil and sediment organisms. This is confirmed by the results of the reproduction toxicity test with earthworms (OECD 222), in which the NOEC was observed to be 1000 mg/kg soil. Therefore further testing with sediment organisms is waived.

12.2. Persistence and degradability

No biodegration.

12.3. Bioaccumulative potential

No potentials known

12.4. Mobility in soil

Not expected to migrate. Insoluble.

12.5. Results of PBT and vPvB assessment

Not matching PBT or vPvB criteria.

12.6. Other adverse effects

No environmental problems expected, if handled and treated in accordance with standard industrial.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1.Waste treatment methods

Product Information

Disposal required in compliance with all waste management related state and local regulations. The choice of the appropriate method of disposal depends on the product composition by the time of disposal as well as the local statutes and possibilities for disposal. Hazardous waste according to European Waste Catalogue (EWC).

> European Waste Code for the mixture: 06 13 03 (Wastes from Carbon Black_Wastes not otherwise specified) and 06 13 99 (Wastes from Inorganic Chemical Processes not otherwise specified).

Empty containers should be treated as waste.

Waste treatment methods must respect the "Waste hierarchy" according to the European directive 2008/98/CE:

(a) prevention;
(b) preparing for re-use;
(c) recycling;
(d) other recovery, e.g. energy recovery; and
(e) disposal.

SECTION 14: TRANSPORT INFORMATION

14.1 UN number	Not applicable, non hazardous material
14.2 UN proper shipping name	Not applicable, non hazardous material
14.3 Transport hazard class(es)	Not applicable, non hazardous material
14.4 Packing group	Not applicable, non hazardous material
14.5 Environmental hazards	Not applicable, non hazardous material
14.6 Special precautions for user	Not applicable, non hazardous material
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable, non hazardous material

SECTION 15: REGULATORY INFORMATION

15.1.Safety, health and environmental regulations/legislation specific for the substance

REACH

At the establishment date of the SDS:

- This substance is not identified as a substance of very high concern for Authorisation (SVHC)
- This substance is not under restrictions (Annex 17)
- This substance is not in the evaluation's process

CLP

At the establishment date of the SDS:

- This substance is not included at CLP annex 6

15.2. Chemical Safety Assessment

Not relevant because the substance is not classified.

SECTION 16: OTHER INFORMATIONS

According to Article 31 of the Regulation (EC) No 1907/2006 (REACH), a Safety Data Sheet (SDS) must be provided for hazardous substances or preparations. This product does not meet the classification criteria of the Regulation (EC) No 1272/2008 (CLP). Therefore such document is outside the scope of Article 31 of REACH and the requirements for content in each section do not apply.

In accordance with REACH article 31(5), safety data sheets shall be supplied in an official language of the Member State(s) where the substance or mixture is placed on the market. This obligation, however, only applies for hazard-classified products which require a formal SDS. Since this product is not hazard-classified, this SDS is, in accordance with current regulation, provided in English language only.

Abbreviations, acronyms

REACH: Registration, Evaluation and Authorisation of Chemicals
OECD = Organization for Economic Co-operation and Development
PNOS: Particles Not Otherwise Specified
bw = body weight
LD50 = 50% Lethal Dose - Chemical amount, given at once, which causes the death of 50% (one half) of a group of test animals
LC50 = 50% Lethal concentration - Concentration of a chemical in air or a chemical in water which causes the death of 50% (one half) of a group of test animals
LL = Lethal Loading
SDS: Safety Data Sheet
ECHA: European Chemicals Agency
CMR: Carcinogenic (C) or Mutagenic (M) or Toxic to reproduction (R)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: veryPersistant and veryBioaccumulable
ADR: Accord for dangerous goods by road
EC: European Inventory
CAS: numerical identifier assigned by Chemical Abstracts Service (CAS)
PEL: Permissible Exposure Limits
SVHC: Substances of very high concern for Authorisation
TLV-TWA: Threshold Limit Value-Time Weighted Average (8 hours)
ACGIH: American Conference of Governmental Industrial Hygienists
w/w: weight divided by weight (mass concentration)
IARC: The International Agency for Research on Cancer
NA: Not applicable
ACGIH: American Conference of Governmental Industrial Hygienists
MFSU : Manufacture, Formulation, Supply And Use

General information

This document was prepared by a competent person who has been properly trained for SDS's drafting. The information contained herein is given in good faith and is accurate to the best of knowledge at the date indicated above. It is understood by the user that any use of the product for purposes other than those for which it was designed entails potential risk. The information given herein in no way dispenses the user from knowing and applying all provisions regulating his activity. The user bears sole liability for the precautions required when using the product. The regulatory texts indicated herein are intended to aid the user to fulfil his obligations.

Tracking

Version 1	Creation
Version 2	1.1 Description modification / Composition modification Charcoal to Activated Carbon – High Density Skeleton
Version 3	1.1 Modification of the name and add of the CAS Number and the inquiry number
Version 4	1.1 Add REACH Registration number
Version 5	9.1 Modification physical and chemical properties

Main bibliographic sources:

Data comes from registration dossiers submitted to ECHA
Candidate List of substances for authorization
REACH Annex XIV
REACH Annexe XVII
Guidance

- Guidance on safety data sheets
- Guidance on the Application of the CLP Criteria
- Guidance on labelling and packaging

ACGIH review : https://www.acgih.org/
http://www.iarc.fr/
http://www.waste.ru/uploads/library/ewc_paper-v1.09.pdf
GESTIS International Limit Values – DGUV

End of the safety data sheet