

# Safety Data Sheet



## 1. Identification of the Substance/Mixture and the Supplier

Supplier : National Institute of Advanced Industrial Science and Technology (AIST)  
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Identity of : Certified reference material NMIJ CRM 5714-a  
 Substance/Mixture

Carbon Black (Nitrogen Specific Volume Adsorbed –BET100)  
 Recommended Use of : This CRM is intended for use in the quality control and validation of  
 the Chemical and analytical methods and instruments used for the measurements of  
 Restriction on Use nitrogen specific volume adsorbed and the determination of specific  
 surface area by the multipoint BET method. Do not use this reference  
 material for other purposes than testing/research.  
 This CRM is a reference material (specified in the Japanese Industrial  
 Standard (JIS) Q 0030).

## 2. Hazards Identification

GHS classification	Explosives	: Classification not possible
	Flammable gases	: Classification not possible
	Pyrophoric gases	
	Flammable aerosols	: Classification not possible
	Oxidizing gases	: Classification not possible
	Gas under pressure	: Classification not possible
	Flammable liquids	: Classification not possible
	Flammable solids	: Not applicable
	Self-reactive substances and mixtures	: Not applicable
	Substances and mixtures which, in contact with water, emit flammable gases	: Classification not possible
	Oxidizing liquid	: Classification not possible
	Oxidizing solid	: Classification not possible
	Organic peroxides	: Classification not possible
	Corrosive to metals	: Not applicable
	Acute toxicity (Oral)	: Not classified
	Acute toxicity (Dermal)	: Not applicable

Acute toxicity (Inhalation, gas)	: Classification not possible
Acute toxicity (Inhalation, vapor)	: Classification not possible
Acute toxicity (Inhalation, dust/mist)	: Classification not possible
Skin corrosivity/irritant	: Not classified
Severe eye damages/eye irritant	: Not classified
Respiratory sensitization	: Classification not possible
Skin sensitization	: Classification not possible
Germ-cell mutagenicity	: Classification not possible
Carcinogenicity	: Class 2
Reproductive toxicity	: Classification not possible
Specific target organ toxicity/systemic toxicity (Single exposure)	: Classification not possible
Specific target organ toxicity /systemic toxicity (Repeated exposure)	: Class 1 (Lung)
Aspiration hazard	: Classification not possible
Hazardous to the aquatic environment, acute hazard	: Not classified
Hazardous to the aquatic environment, long-term hazard	: Classification not possible

GHS label element :



Signal word :

Danger

Hazard and toxicity :

Self-heating: May be a fire  
Doubt of possible carcinogenesis  
Respiratory disorders due to prolonged or repeated exposure

Other hazard and toxicity :

-

GHS label element :

[Preventive measures]  
Do not handle until all safety precautions are read and understood.  
Keep it in a cool place and shield it from sunlight.  
Do not breathe dust.  
Wash hands thoroughly after handling.  
Do not eat, drink or smoke when using this product.  
Wear protective gloves / protective clothing / protective eyewear / protective surface.  
[Response]  
If there is concern of exposure or exposure: Get medical advice / attention.  
If you feel unwell, get medical advice / attention.  
[Storage]  
Keep tightly closed, avoid direct sunlight and store at 5 °C to 35 °C.

[Disposal]

Dispose of this reference material in accordance with applicable legislation and local government ordinance.

Entrust disposal of this reference material to a professional waste disposal company licensed by prefectural governor.

Hazardous and toxic properties not specified in the above are not subject to the classification or not classifiable.

### 3. Composition/Information on Ingredients

Substance or mixture	:	Single substance
Chemical name	:	Carbon black
Synonym	:	Carbon
Chemical formula	:	C
Molecular weight	:	12.0
CAS number	:	1333-86-4
Content	:	99 % or more
Reference Number in Gazetted List in Japan	in	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (5)-3328, (5)-5222 Industrial Safety and Health Act : Published

### 4. First-aid Measures

If inhaled	:	Move to a fresh air place and rest in an easy-to-breathe posture. If symptoms persist, call a doctor.
If on skin	:	Wash with plenty of water. If symptoms persist, call a doctor.
If in eyes	:	Wash carefully with water for 15 to 20 minutes. If contact lenses are inserted, take them out if possible, and continue to rinse. Seek medical advice immediately.
If swallowed	:	Wash mouth thoroughly with water Seek medical advice.
The most important characteristics and symptoms	:	No-data
Measures to be taken to protect the person applying first aid	:	Use appropriate personal protective equipment for eyes and skin if required.

### 5. Fire-fighting Measures

Extinguishing media	:	Water spray, Powder, Carbon dioxide (CO <sub>2</sub> ), Foam (alcohol-resistant foam), CO <sub>2</sub> , Dry sand
Unusable extinguishing media	:	Rod-like water discharge
Specific hazards at the time of fire	:	It may catch fire with heat, sparks and flames. It burns when it heats violently. May form irritating, corrosive and toxic gas at the time of fire.
Specific extinguishing	:	If it is not dangerous, move the container from the fire area.

measures  
Protecting fire-fighting personnel : Eliminate ignition sources if safe to deal with.  
: Use appropriate air respirator, protective clothing (heat resistance).

## 6 . Accidental Release Measures

Personal Precaution : Eliminate all ignition sources.  
Immediately designate restricted leakage area with appropriate distance taken in every direction.  
Keep out unauthorized people.  
Before entering a confined area, ventilate the area.

Personal Protective Equipment and Emergency Procedures : Wear appropriate personal protective equipment including protective mask, eye protection and protective gloves.

Environmental Precautions : Avoid release to the environment.

Recovery and Neutralization : Collect leaked materials in empty containers and dispose of them later.  
Damp with water and reduce dust in air to prevent scattering.  
Eliminate all ignition sources immediately (No smoking, sparks or flame in surrounding areas).  
Cover affected area with plastic sheet to prevent scattering.

Prevention of Secondary Disaster : Eliminate all ignition sources immediately (No smoking, sparks or flame in surrounding areas).  
Cover affected area with plastic sheet to prevent scattering.

## 7 . Handling and Storage Precautions

Handling

Engineering Precautions : Take the engineering precautions stipulated in “8. Exposure Controls/Personal Protection” and wear personal protective equipment as necessary.

Local and General Ventilation : Provide local and general ventilation as necessary.

Precautions for Safe Handling : Do not eat, drink or smoke when using this reference material.  
Keep cool. Protect from sunlight.  
Do not breathe dust.  
Use closed-type facilities as much as possible for handling such as transportation, storage and use since carbon black is easy to be scattered.  
Provide precautionary measures to prevent scattering if it is inevitable to handle it in open-type facilities.  
Gaggle thoroughly and wash hands and face thoroughly after handling.

Storage

Appropriate Storage Conditions : Store in a closed container. Protect from direct sunlight. Store at temperatures between 5 °C and 35 °C.  
Avoid contact with strong oxidizers such as chlorate and nitrate.

Safe Container Packaging Material : Glass

※Please refer the certificate about the details of appropriate storage conditions and precautions for

the use as reference material.

## 8. Exposure Controls/Personal Protection

Threshold Limit Value

3.0 mg/m<sup>3</sup>

Occupational exposure limit

- ACGIH TLV-TWA : 3.0 mg/m<sup>3</sup>
- Japan Society for : 1 mg/m<sup>2</sup> (Inhalable dust), 4 mg/m<sup>3</sup>(Total dust)

Occupational Health

Recommended Reference Value

- OSHA PEL TWA : 3.5 mg/m<sup>3</sup>

Facility engineering control

- Ventilation/Exhaust : To prevent exposure, install airtight equipment or local ventilation equipment.  
Hand wash near the handling place; install facilities for washing eyes and body wash as necessary.  
Perform local exhaust or general ventilation and maintain dust concentration below the controlled concentration

Safety Control/

Gas Detection

Storage Precaution

- : -
- : Strict ban on fire. Avoid storage under direct sunlight and contact with strong oxidizing substances such as nitrates.

Personal Protective Equipment (PPE)

- Respiratory organ : Dust protective mask
- Hand : Vinyl or rubber gloves
- Eyes : Dustproof glasses
- Skin and body : Protective clothing

Hygiene Controls

Handle this reference material in accordance with industrial health and safety standards.

## 9. Physical and Chemical Properties

- Appearance, etc. : Powder and grain with a diameter of 1 mm to 2 mm.
- Color : Black
- Odor : Odorless
- pH : 7 to 8 (sludge)
- Melting point : Over 3000 °C
- Boiling point : 3000 °C (sublimation)
- Flashing point : No data
- Explosive range : No data
- Vapor pressure : Negligible
- Relative vapor density(Air=1) : No data
- Specific gravity or bulk specific gravity : 1.7 to 1.9 (the apparent specific gravity is 0.3 to 0.6.)
- Solubility : It is insoluble in water or other solvents, but it is easily dispersed if a surfactant is used.
- n*-Octanol/water partition coefficient (Log Po/w) : No data

- Auto-ignition temperature : Generally auto-ignition temperature is 290 to 520 °C. If it is left for a long time at a temperature of about 150 °C or more, ignition may occur due to heat storage.
- Decomposition temperature : 3000 °C (sublimation)

## 10. Stability and Reactivity

- Stability : Stable under normal condition
- Reactivity : Reacts with strong oxidants, causing fire and explosion hazard.
- Hazardous Reactivity : It produces a dangerous reaction with oxidant.  
A mixture of dust and air may explode.
- Conditions to avoid : Avoid heating, sparks and naked flames. Prevent the diffusion of dust.
- Incompatible materials : Strong oxidizing agents such as chlorate and nitrate.
- Hazardous decomposition products : It decomposes on burning producing toxic and corrosive fume (carbon monoxide and carbon dioxide).

## 11. Toxicological information

### Acute Toxicity

- Acute toxicity (Oral) : No classification, based on the following data:  
Rat: LD50 value > 8,000 mg/kg and > 10,000 mg/kg (2 cases) (SIDS (2007))
- Acute toxicity (Dermal) : Not classifiable due to insufficient data  
Rabbit: LD50 value > 3,000 mg/kg (RTECS (Access on August 2015) and GESTIS (Access on August 2015))  
The above data was not taken account of for classification because it was given by List 3 and it was not possible to have access to the original articles for confirmation.
- Acute toxicity (Inhalation: gas) : Not classified
- Acute toxicity (Inhalation: vapor) : Not classified
- Acute toxicity (Inhalation: dust/mist) : Not classified
- Skin Corrosion/Irritation : No classification, based on the following data:  
It was reported that, in the skin irritation study using rabbits (OECD TG404), no irritation was observed after 500 mg carbon black was applied in a closed environment for four hours (SIDS (2007)).  
It was also reported that, in another skin irritation study using rabbits, no irritation was observed after carbon black (20 % ~ 27 %) was applied (SIDS (2007)).
- Serious Eye Damage/ Eye Irritation : No classification, based on the following data:  
There are three reports on eye irritation studies using rabbits (OECD TG 405). All of the three reports stated that application of this reference material (undiluted liquid) caused no irritation (SIDS (2007)).
- Respiratory sensitization : Classification is not possible due to lack of data

- Skin sensitization : Classification is not possible due to lack of data
- Germ Cell : Not classifiable in accordance with the Guidance, based the following data:
- Mutagenicity
- In vivo studies:
- Positive results were reported in genetic mutation (hprt) study using pneumocytes of rats exposed through inhalation and intratracheal instillation. Both positive and negative results were reported in DNA adducts formation study using lungs of rats exposed through inhalation. The positive results, however, are considered to be attributed to active oxygen species generated along with polycyclic aromatic hydrocarbons or inflammation. In other words, the positive results are not considered to indicate mutagenicity of carbon black itself (IARC 93 (2010), DFGOT vol. 18 (2002) and SIDS (2007)).
- In vitro studies:
- Both positive and negative results were reported in microbial reverse mutation study. Positive results were reported in micronucleus study of cultured mammalian cells. Negative results were reported in mouse lymphoma assay and sister chromatid exchange assay (IARC 93 (2010), SIDS (2007) and DFGOT vol. 18 (2002)).
- Based on the above, it is believed this reference material itself does not feature mutagenicity.
- Carcinogenicity : Classified as Category 2, based on the following data:
- Humans:
- In cohort studies and case-control studies mainly in United Kingdom, Germany and USA, there were some reports to suggest correlation between occupational exposure to this reference material and excess risk for deaths due to lung cancer. Evidences to support this correlation were not obtained since possible effects of tobacco smoking cannot be excluded and significant difference of excess risk for deaths due to lung cancer disappeared after correction of effects of co-exposure to asbestos and talc (IARC 93 (2010) and ACGIH (7<sup>th</sup>, 2011)). In addition, it was stated that although there were some reports suggesting excess risks for cancers of urinary bladder, kidney, stomach and oesophagus, none of them were sufficient evidences to support human carcinogenicity of this reference material (IARC 93 (2010)).
- Laboratory animals:
- In the studies in which female mice and rats were exposed to Printex 90 (primary particle size: 14 nm, specific surface area: 227±18.8 m<sup>2</sup>/g, mass median aerodynamic diameter (MMAD): 0.64 µm) through inhalation for different periods: a group of female mice: 13.5 months, three groups of female rats: 43 weeks, 86 weeks and 24 month, an increase of incidences of benign and malignant neoplasms of lungs including bronchiolar/ alveolar adenomas, adenocarcinomas, squamous cell carcinoma was observed ((IARC 93 (2010) and SIDS (2007)).
- In another series of studies, male and female rats were exposed to Elftex 12 (large mode (67 % of the total particles) (particle size: 2.0~2.4 µm, MMAD: 2.0 µm) and small mode (33 % of the total particles) (particle size: 0.02~0.1µm)) through inhalation for two years. For the male rats, an increase of pulmonary tumor incidence was not observed.

	<p>For the female rats, a dose-dependent increase of incidence was observed for adenomas and adenocarcinomas of their lungs (IARC 93 (2010) and SIDS (2007)).</p> <p>In the intratracheal administration studies using female rats, two type of this reference material were administered. It was reported that an increase of pulmonary tumors was observed (IARC 93 (2010) and SIDS (2007)).</p> <p>Based on these human cohort study findings and animal study results, this reference material is classified as Group 2B by IARC (IARC 93 (2010)) and as Category A3 by ACGIH (ACGIH (7<sup>th</sup>, 2011)).</p>
Reproductive toxicity	: Classification is impossible due to lack of data.
Specific target organ toxicity/Systemic toxicity (Single exposure)	: Classification is impossible due to lack of data.
Specific Target Organ Toxicity/Systemic Toxicity (Repeated Exposure)	<p>: Classified as Category 1 (Respiratory system), based on the following data:</p> <p>Humans:</p> <p>In a plant manufacturing this reference material, repeated inhalation exposure to this reference material was considered to cause impairment of pulmonary function, increase of incidence of respiratory symptoms and abnormal findings in chest radiographs. In the large-scale cohort studies involving 19 sites in seven European countries, however, only mild drop of pulmonary function parameters was indicated as prediction for 40-year exposure to carbon black of 1.0 mg/m<sup>3</sup> (respirable fraction, eight-hour TWA).</p> <p>Laboratory animals:</p> <p>Male rats were exposed to this reference material through inhalation for 13 weeks (6 hours per day and 5 days per week). At concentrations of 7.1 mg/m<sup>3</sup> (Guidance value equivalent: 0.0051 mg/L/6 hours) or higher, inflammation, hyperplasia and fibrosing of alveolar epitheliums were observed, and dust clearance rate of lungs dropped. NOAEL was 1.0 mg/m<sup>3</sup> (SIDS (2007)).</p> <p>In another study, male and female rats were exposed to carbon black through inhalation for two years (16 hours per day and 5 days per week). Similarly, at concentrations of 2.5 mg/m<sup>3</sup> (Guidance value equivalent: 0.0046 mg/L/6 hours) or higher, inflammation of alveolar epitheliums, squamous metaplasia, hyperplasia and chronic active inflammation were observed (SIDS (2007)).</p> <p>Female rats, mice and hamsters were exposed through inhalation at the same concentration for 13 weeks. At the concentrations of 7 mg/m<sup>3</sup> or higher, clear inflammatory tissue changes were observed for the rats, which was more obvious than the mice and hamsters. The dust clearance rate of the hamsters was found highest (ACGIH (7<sup>th</sup>, 2011)).</p> <p>These results suggest that toxicological effects on respiratory system and dust clearance rate of lungs are varied among different species. No toxicological effects were observed in the 41-week dermal administration to mice and in the two-year black carbon feeding in diets to rats and mice (SIDS (2007)).</p> <p>In conclusion, significant pulmonary tissue changes were observed in</p>



laboratory animals within the dose range of Category 1 though inhalation exposure caused only slight drop of respiratory function in humans.

Aspiration hazard : Classification is impossible due to lack of data.

## 12. Ecological Information

Hazard to the Aquatic Environment (Acute Aquatic Toxicity) : No classification, because the following data suggest this reference material does not feature acute aquatic toxicity at its aqueous solubility (insoluble (HSDB (2009))).

Alga (Scenedesmus): 72 hours ErC50 > 10000 mg/L (SIDS, 2006)  
Crustacea (Daphnia magna): 24 hours LC50 > 5600 mg/L (SIDS, 2006)  
Fish (Tribolodon hakonensis): 96 hours LC50 > 1000 mg/L (SIDS, 2006)

Hazard to the Aquatic Environment (Chronic Aquatic Toxicity) : Not classifiable, based on the followings:  
This reference material is poorly water-soluble. At concentrations to its aqueous solubility, there are no reports on acute aquatic toxicity. Its behavior and bioaccumulation potential in water are unknown as well.

Persistence and Degradability : This reference material remains as is because it does not degrade in natural environment

Bioaccumulation Potential : This reference material is excreted spontaneously and hardly accumulated.

Mobility in soil ; No data

Ozone depletion potential : Not applicable

## 13. Disposal Considerations

Residual Waste : Dispose of this reference material in accordance with applicable legislation and local government ordinance.  
When the above-mentioned treatments are not possible, entrust disposal of residual waste to a professional waste disposal company licensed by prefectural governor.

Contaminated Container and Package : Disposal of the empty container should be after the complete removal of the content.

## 14. Transport Information

UN Number : 1361

UN Classification : Class 4.2

Classification

Material name : Carbon black, CARBON

Container grade : PG III

ICAO/IATA : Class 3,

Marine pollutant : Not applicable

Precautions : Transport this reference material carefully while keeping it away from direct sunlight and fire and preventing accidental release due to falling, overturning, etc.

## 15. Regulatory Information

Poisonous and Deleterious Substances Control Act	:	Not applicable.
Pneumoconiosis Act	:	Article 2, Enforcement Order: Article 2, Appendix “Work in Dusty Environment”
Industrial Safety and Health Act	:	Article 57 (Enforcement Order: Article 18) Hazardous substance whose name, etc. must be labeled Article 57-2 (Enforcement Order: Article 18-2) Hazardous substance whose name, etc. must be notified , No.130
Civil Aeronautics Act	:	Ban on transportation
Ship Safety Law	:	Flammable substances/Pyrophoric substance
Act on Port Regulations	:	Article21-2, Other dangerous goods (flammable goods)

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## 16. Other Information

### Others

The information in this document is not intended to be exhaustive and is based on currently available information and data. The measures given in this document are applicable only to normal handling conditions. When handling this reference material under special conditions etc., it is recommended to take safety measures appropriate to each specific application and context of use. This document is intended to provide information and not intended to guarantee anything in handling this reference material.

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