

1. Chemicals and company information

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| (1) Product name Grade | Carbon Black Master batch CB9095 |
| (2) Recommended use of the product and restrictions on its use | |
| ① Recommended use of the product | PETS Compound |
| ② Limitations on use of the product | No data |
| (3) Supplier information | |
| ① Company | Muil Chemical Co., Ltd |
| ② Address | 237, Yeosusandan-ro, Yeosu-si, Jeollanam-do, 59619 Korea |
| ③ Tel: | +82-61-690-9425 |

2. Hazard and Risks

- | | |
|---|----------------|
| (1) Hazard classification | Not applicable |
| (2) Warning label items, including precautionary statements | |
| ① Symbols | Not applicable |
| ② Signal word | No data |
| ③ Hazard statement | No data |
| ④ Precautionary statements | |

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| Prevention | P201 Obtain instructions before use. |
| | P202 Do not handle until all safety precautions have been read and understood. |
| | P235 + P410 Keep at the low temperature and avoid direct sunlight |
| | P260 Avoid breathe dust, fume, gas, mist, vapors, spray |
| | P264 Wash thoroughly after handling |
| | P270 Do not eat, drink or smoke while using this product. |
| Response | P280 Wear protective gloves, protective clothing, eye protection, face protection |
| | P308 + P313 If exposed, then seek medical advice |
| | P314 If you feel unwell, get the medical advice. |
| | P333 + P313 If skin irritation or rash occurs, seek medical advice |
| | P361 Remove all contaminated clothing |
| | P362 Take off contaminated clothing and wash before reuse. |
| Storage | P390 Absorb spillage to avoid material damage |
| | P403 + P233 Keep container tightly closed in a well-ventilated place. |
| | P403 + P235 Store in a well-ventilated place. Keep cool. |
| | P410 Avoid direct sunlight |
| Disposal | P420 Keep away from other materials |
| | P501 Dispose of contents container according to applicable regulations |

(3) Other hazards which do not fall under Hazard category (NFPA)

① Carbon Black

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| Health | 0 |
| Flammability | 1 |
| Reactivity | No data |

② PETS

| | |
|--------------|---|
| Health | 1 |
| Flammability | 1 |
| Reactivity | 0 |

Reference: National Fire Protection Association (NFPA)

*NFPA 1, Fire Code, advances fire and life safety for the public and first responders as well as property protection by providing a comprehensive, integrated approach to fire code regulation and hazard management. It addresses all the bases with extracts from and references to more than 130 NFPA® codes and standards including such industry benchmarks as NFPA 101, NFPA 54, NFPA 58, NFPA 30, NFPA 13, NFPA 25, and NFPA 72.

3. Composition / Information on Ingredients

| Chemical Name | Common name | CAS number | Contents |
|---|--------------|------------|----------------|
| Carbon Black | Carbon Black | 1333-86-4 | |
| Fatty acids, (C=16-18), esters with pentaerythritol | PETS | 85116-93-4 | |
| Poly(Ethylene) | LLDPE | 9002-88-4 | |
| | | | >99% |

4. First Aid Measures

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| (1) Eye contact | If it gets on your eyes, wash it carefully with water for 20 minutes. If eye irritation occurs, seek medical advice |
| (2) Skin contact | If skin irritation or rash occurs, seek medical advice Take off contaminated clothing and wash before reuse Remove contaminated clothing and shoes and isolate contaminated areas Wash your skin and eyes immediately with plenty of water for at least 20 minutes if you contacted with this material |
| (3) Inhaled | If exposure then get medical advice Move to a place with fresh air Please keep warm and stabilize |
| (4) Ingestion | If exposed or feel uncomfortable, then seek medical advice If substance is ingested or inhaled, do not use artificial respiration with mouth-to-mouth method and use appropriate respiratory medical equipment. |
| (5) Other precautions from physician | Let the health care worker to know about the material and take protective measures |

5. Fire - Fighting Measures

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| (1) Suitable extinguishing media | Use alcohol foam, carbon dioxide or water spray for digestion related to this material Use dry sand or earth for digestion |
| (2) Specific hazards arising from the chemical | Stable at the room temperature Can be decomposed at a high temperature and generates a toxic gas |
| (3) Protective equipment and precautions for fire-fighting | Rescuers should wear appropriate protective equipment. Extinguish the area and maintain safety distance Be careful because it reacts (vigorously) with water to release flammable, corrosive, toxic gases. Move container from fire area if it is not hazardous. In case of tank fire, extinguish at maximum distance In the case of fire in a tank then cool the tanks with large amounts of water even after the fire was extinguished. In the case of fire in a tank, then stay away In the case of a large fire in a tank, use unmanned firefighting equipment and allow it to retreat if it is not possible |

6. Accidental Release Measures

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| (1) Personal precautions and protective equipment | Do not breathe dust, fume, gas, mist, vapors, spray Wipe off any spills immediately and follow all protective precautions Isolate contaminated areas If you do not need to enter or do not have protective equipment, do not go in Remove all ignition sources Stop the leakage if it is not dangerous Do not touch a damaged container or spill without adequate protection Wear a full face protection even if it is not fire Cover with plastic sheet to prevent diffusion Prevent dust formation Note the substances and conditions to avoid |
| (2) Protection of the environment | Prevent entry into waterways, sewers, basements, and confined spaces Absorb spillage to prevent material damage |
| (3) Methods for cleaning up | For water leaks use the appropriate tools and vacuum cleaners, with high-performance filter system is equipped. Keep the container according to the applicable laws and regulations. |

7. Handling and Storage

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| (1) Safety Handling Tips | Avoid breathing dust, fume, gas, mist, vapors, spray After contacting this product wash hands with plenty of water Avoid eating and smoking while using this product. Handle it outdoors or in a well-ventilated area Do not carry contaminated clothing out of the workplace Follow all MSDS and label precautions as product residues may remain after emptying containers Handle and store carefully Be careful while opening |
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|------------------|---|
| | Avoid prolonged or repeated skin contact |
| | Note the substances and conditions to avoid |
| | Before starting work follow the engineering controls rules and wear personal protective clothes |
| (2) Safe storage | Store only in original container |
| | Keep container tightly closed in a well-ventilated place |
| | Store and handle in accordance with all current regulations. |
| | The empty drum should be completely drained, properly blocked and immediately returned to the drum regulator or properly positioned |
| | Keep away food and drinks |

8. Exposure Controls / Personal Protection

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| (1) Exposure standards for chemical substances, biological exposure standards, etc. | |
| ① Local regulation | |
| Carbon Black | TWA - 3.5mg/m3 |
| PETS | No data |
| ② ACGIH regulation | |
| Carbon Black | TWA - 3.5mg/m3 |
| PETS | No data |
| ③ Biological exposure standard | No data |
| (2) Proper engineering management | Use process isolation, local exhaust ventilation or other engineering controls to keep air levels below exposure limits. Install the working facilities in order to make clean and comfortable work place |
| (3) Personal protective equipment | Wear a respirator that has been approved by the Korean Occupational Safety and Health Administration in accordance with the physicochemical properties of the substance being exposed |

9. Physical & Chemical Properties

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|---|-----------------|
| (1) Carbon Black | |
| ① Appearance | |
| Form | Powder, bead |
| Color | Black |
| ② Odor | Odorless |
| ③ Odor threshold | No data |
| ④ pH | Not applicable |
| ⑤ Melting point / freezing point | (About 3550 °C) |
| ⑥ Initial boiling point and boiling range | 4200 °C |
| ⑦ Flash point | > 500 °C |
| ⑧ Evaporation rate | Not applicable |
| ⑨ Flammability (solid, gas) | No data |
| ⑩ Upper / lower limit of burning or explosion range | No data |
| ⑪ Vapor pressure | No data |
| ⑫ Solubility | Do not melt |
| ⑬ Vapor density | Not applicable |
| ⑭ Specific gravity | 1.7-2.1 |
| ⑮ N-Octanol / water partition coefficient | No data |
| ⑯ Auto ignition temperature | 900 °C |
| ⑰ Decomposition temperature | No data |
| ⑱ Viscosity | No data |
| ⑲ Molecular weight | 12.01 |
| (2) PETS | |
| ① Appearance | |
| Form | Solid, beads |
| Color | White |
| ② Odor | Very weak smell |
| ③ Odor threshold | None |
| ④ pH | Neutrality |
| ⑤ Melting point / freezing point | 62 ~ 68 °C |
| ⑥ Initial boiling point and boiling range | Not applicable |
| ⑦ Flash point | 304 °C |

- (17) Specific target organ toxicity (repeated exposure) No data
 (18) Aspiration hazard No data

12. Ecological Information

- (1) Ecotoxicity
 ① Fish
 Carbon Black LC50 > 1000 mg/l 96 hr Other (Tribolodon hakonensis)
 PETS LC50 > 0.00000000000000115 mg/l 96 hr
 ② Crustaceans
 Carbon Black EC50 > 5600 mg/l 24 hr Daphnia magna (OECD Guideline 202, GLP)
 PETS LC50 > 0.0000000000000000000000266 mg/l 48 hr
 ③ Birds
 Carbon Black ErC50 > 10000 mg/l 72 hr Other (Desmodesmus subspicatus)
 PETS EC50 > 0.000000000000000279 mg/l 96 hr
 (2) Persistence and degradability
 ① Persistence No data
 ② Degradability No data
 (3) Bioaccumulative potential
 ① Condensability No data
 ② Biodegradable No data
 (4) Mobility in soil No data
 (5) Ozone layer harmful effect No data
 (6) Other harmful effects No data

13. Disposal Considerations

- (1) Disposal method Dispose of contents and container in accordance with local regulations
 (2) Disposal Considerations Dispose of contents container according to applicable regulations.

14. Transport Information

- (1) UN number
 Carbon Black 1361
 PETS Not regulated as dangerous goods
 (2) Proper shipping name Not regulated as dangerous goods
 (3) Hazard rating in transport
 Carbon Black 4
 PETS Not applicable
 (4) Packing group Not applicable
 (5) Marine pollutants Not applicable
 (6) Special safety measures that the user needs or needs to know about transportation
 ① Emergency measures in case of fire
 Carbon Black F-A
 PETS Not applicable
 ② Emergency Action
 Carbon Black S-J
 PETS Not applicable

15. Regulatory Information

- (1) Regulation by the Industrial Safety and Health Act No data
 (2) Regulation under the Harmful Chemical Substance Control Act No data
 (3) Regulations under the Dangerous Goods Safety Management Act No data
 (4) Regulations under the Waste Management Act No data
 (5) Regulation due to ozone layer hazard Not applicable
 (6) Other domestic and foreign regulations
 ***Domestic regulation
 ① Residual Organic Pollutant Control Act Not applicable
 ***Foreign regulation
 ② USA Administration Information (OSHA Regulation) Not applicable

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|---|---|----------------|
| ③ | USA Administration Information (CERCLA Regulation) | Not applicable |
| ④ | USA Management Information (EPCRA 302 regulation) | Not applicable |
| ⑤ | USA Management Information (EPCRA 304 regulation) | Not applicable |
| ⑥ | USA Management Information (EPCRA 313 regulation) | Not applicable |
| ⑦ | USA Management Information (Rotterdam Convention substance) | Not applicable |
| ⑧ | USA Management Information (Stockholm Convention substance) | Not applicable |
| ⑨ | USA Management Information (Montreal Protocol substance) | Not applicable |
| ⑩ | EU classification information (confirmed classification result) | Not applicable |
| ⑪ | EU classification information (hazard notes) | Not applicable |
| ⑫ | EU classification information (Safety notes) | Not applicable |

16. References

- (1) This Safety Data Sheet was compiled with data and information from the following sources: KOSHA, NITE, ESIS, NLM, SIDS, IPCS
- (2) **DISCLAIMER OF LIABILITY:** The information in this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. This MSDS was prepared and is to be used only for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

17. Data

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|---|------------|
| (1) Issued First Date | 2013-12-11 |
| (2) Number of revisions and date of last revision | |
| Number of revisions | 1 |
| Date of last revision | 2017-09-13 |
| (3) Other | |

The Material Safety Data Sheets (MSDS) are prepared and edited with reference to the MSDS provided by the Korea Occupational Safety and Health Agency.