SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

SRM Number: 2684c
SRM Name: Bituminous Coal (Nominal Mass Fraction 3 % Sulfur)
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use
This Standard Reference Material (SRM) is intended primarily for use in the evaluation of techniques used in the analysis of coals and materials of a similar matrix. A unit of SRM 2684c consists of 50 g of bituminous coal ground to pass a 212 µm (70 mesh) sieve, homogenized, and packaged in an amber glass bottle under an argon atmosphere, and sealed in an aluminized bag.

Company Information
National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

Telephone: 301-975-2200
FAX: 301-948-3730
E-mail: SRMMMSDS@nist.gov
Website: http://www.nist.gov/srm

2. HAZARDS IDENTIFICATION

Classification

Physical Hazard: Not classified.
Health Hazard: Not classified.
OSHA Defined Hazard: Combustible dust

Label Elements

Signal Word
WARNING

Hazard Statement(s): May form combustible dust concentrations in air.

Precautionary Statement(s): Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: Coal powder

Other Designations: Not applicable.

Components are listed in compliance with OSHA’s 29 CFR 1910.1200; for the actual values see the NIST Certificate of Analysis.

<table>
<thead>
<tr>
<th>Hazardous Component(s)</th>
<th>CAS Number</th>
<th>EC Number (EINECS)</th>
<th>Nominal Mass Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal Powder</td>
<td>Not available</td>
<td>Not available</td>
<td>100</td>
</tr>
</tbody>
</table>
4. FIRST AID MEASURES

Description of First Aid Measures:

**Inhalation:** If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

**Skin Contact:** Wash skin with soap and water for at least 15 minutes. Thoroughly clean and dry contaminated clothing before reuse.

**Eye Contact:** Flush eyes with water for at least 15 minutes. If necessary, seek medical attention.

**Ingestion:** If adverse effects occur after ingestion, seek medical treatment.

Most Important Symptoms/Effects, Acute and Delayed: May cause irritation.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek medical attention if needed.

5. FIRE FIGHTING MEASURES

**Fire and Explosion Hazards:** Severe fire hazard. Avoid generating dust; sufficient concentrations of fine dust dispersed in air, and in the presence of an ignition source is a potential hazard. See Section 9, “Physical and Chemical Properties” for flammability properties.

**Extinguishing Media:**
- Suitable: Regular dry chemical, dry sand, water, and regular foam.
- Unsuitable: None listed.

**Specific Hazards Arising from the Chemical:** None listed.

**Special Protective Equipment and Precautions for Fire-Fighters:** Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

**NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)**
- Health = 1
- Fire = 3
- Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

**Personal Precautions, Protective Equipment and Emergency Procedures:** Any accumulated material on surfaces should be removed and properly disposed of. Use suitable protective equipment; see Section 8, “Exposure Controls and Personal Protection”.

**Methods and Materials for Containment and Clean up:** Do not touch spilled material. Notify safety personnel of spills. Collect spilled material in appropriate container for disposal. Isolate hazard area and deny entry.

7. HANDLING AND STORAGE

**Safe Handling Precautions:** Minimize dust generation and accumulation on surfaces. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. See Section 8, “Exposure Controls and Personal Protection”.

**Storage:** Store and handling in accordance with all current regulations and standards. Keep separated from incompatible substances (oxidizing materials).

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

**Exposure Limits:** This material is a particulate matter and adequate inhalation/respiratory protection should be used to minimize exposure.

- OSHA (PEL): 2.4 mg/m³ [respirable, < 5% SiO₂] (TWA)
- OSHA (PEL): 10 mg/m³/(%SiO₂ + 2) [respirable, > 5% SiO₂] (TWA)
- NIOSH (REL): 1 mg/m³ [measured according to MSHA method (CPSU)] (TWA)
- NIOSH (REL): 0.9 mg/m³ [measured according to ISO/CEN/ACGIH criteria] (TWA)
- ACGIH (TLV): No exposure limits available.

**Engineering Controls:** Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.
Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties: Coal Powder

- **Appearance**: Black powder
- **Molecular Formula**: Not applicable
- **Molar Mass (g/mol)**: Not applicable
- **Odor**: Not available
- **Odor threshold**: Not available
- **pH**: Not available
- **Evaporation rate**: Not applicable
- **Melting point/freezing point (ºC)**: Not available
- **Relative Density (g/L)**: Not available
- **Vapor Pressure (mmHg)**: Not applicable
- **Vapor Density (air = 1)**: Not applicable
- **Viscosity (cP)**: Not applicable
- **Solubility(ies)**: Insoluble in water
- **Partition coefficient (n-octanol/water)**: Not available
- **Particle Size**: ≤212 µm (70 mesh)

Thermal Stability Properties:

- **Autoignition Temperature (ºC)**: Not available
- **Thermal Decomposition (ºC)**: Not available
- **Initial boiling point and boiling range (ºC)**: Not available
- **Explosive Limits, LEL (Volume %)**: Not available
- **Explosive Limits, UEL (Volume %)**: Not available
- **Flash Point (ºC)**: Not available
- **Flammability (solid, gas)**: Not available

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid generating dust. Avoid heat, flames, sparks and other sources of ignition. Avoid contact with incompatible materials.

Incompatible Materials: Oxidizing materials.

Fire/Explosion Information: See Section 5, “Fire Fighting Measures”.

Hazardous Decomposition: Thermal decomposition will produce oxides of carbon.

Hazardous Polymerization: Will Occur X Will Not Occur
11. TOXICOLOGICAL INFORMATION

Route of Exposure:  
  X  Inhalation  Skin  Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics:  May cause irritation if inhaled.

Potential Health Effects (Acute, Chronic and Delayed):

  Inhalation:  May cause irritation, chronic inhalation of coal dust may cause pneumoconiosis.
  Skin Contact:  No data available.
  Eye Contact:  No data available.
  Ingestion:  No data available.

Numerical Measures of Toxicity:

  Acute Toxicity:  Not classified.
  Rat, Intratracheal TDLo:  9.26 mg/kg
  Skin Corrosion/Irritation:  Not classified; no data available.
  Serious Eye damage/ Eye irritation:  Not classified; no data available.
  Respiratory Sensitization:  Not classified; no data available.
  Skin Sensitization:  Not classified; no data available.
  Germ Cell Mutagenicity:  Not classified; no data available.
  Carcinogenicity:  Not classified.
    Listed as a Carcinogen/Potential Carcinogen  Yes  X  No
    Coal dust is listed by IARC as Group 3, “Not classifiable as to its carcinogenicity to humans”.
    Coal dust is not listed by NTP or OSHA as a carcinogen.
  Reproductive Toxicity:  Not classified; no data available.
  Specific Target Organ Toxicity, Single Exposure:  Not classified; no data available.
  Specific Target Organ Toxicity, Repeated Exposure:  Not classified; no data available.
  Aspiration Hazard:  Not classified; no data available.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data:  No data available.

Persistence and Degradability:  No data available.

Bioaccumulative Potential:  No data available.

Mobility in Soil:  No data available.

Other Adverse effects:  No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal:  Dispose of waste in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA:  Not regulated by DOT or IATA.

15. REGULATORY INFORMATION

U.S. Regulations:

  CERCLA Sections 102a/103 (40 CFR 302.4):  Not regulated.
  SARA Title III Section 302 (40 CFR 355.30):  Not regulated.
  SARA Title III Section 304 (40 CFR 355.40):  Not regulated.
SARA Title III Section 313 (40 CFR 372.65): Not regulated.
SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

- ACUTE HEALTH: No.
- CHRONIC HEALTH: Yes.
- FIRE: Yes
- REACTIVE: No.
- PRESSURE: No.

State Regulations:
California Proposition 65: Not listed.
U.S. TSCA Inventory: Not listed.
TSCA 12(b), Export Notification: Not listed.
Canadian Regulations:
WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

Issue Date: 25 June 2014

Sources: ChemAdvisor, Inc., MSDS Coal Dust, 21 March 2014.
CDC; NIOSH; NIOSH Pocket Guide to Chemical Hazards; Department of Health and Human Services (DHHS), Centers for Disease Control and Prevention (CDC), National Institute for Safety and Health; Coal Dust, 18 November 2010; available at http://www.cdc.gov/niosh/npg/npgd0144.html (accessed May 2014); see also RTECS Coal Dust, May 2009; available at http://www.cdc.gov/niosh-rtecs/GF7E5BA8.html (accessed June 2014).

Key of Acronyms:

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACGIH</td>
<td>American Conference of Governmental Industrial Hygienists</td>
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<tr>
<td>ALI</td>
<td>Annual Limit on Intake</td>
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<tr>
<td>CAS</td>
<td>Chemical Abstracts Service</td>
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<tr>
<td>CEN</td>
<td>European Committee for Standardization</td>
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<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act</td>
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<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
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<tr>
<td>CPSU</td>
<td>Coal Mine Dust Personal Sample Unit</td>
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<tr>
<td>DOT</td>
<td>Department of Transportation</td>
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<tr>
<td>EC50</td>
<td>Effective Concentration, 50 %</td>
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<tr>
<td>EINECS</td>
<td>European Inventory of Existing Commercial Chemical Substances</td>
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<tr>
<td>EPCRA</td>
<td>Emergency Planning and Community Right-to-Know Act</td>
</tr>
<tr>
<td>IARC</td>
<td>International Agency for Research on Cancer</td>
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<tr>
<td>IATA</td>
<td>International Air Transportation Agency</td>
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<tr>
<td>IDLH</td>
<td>Immediately Dangerous to Life and Health</td>
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<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
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<tr>
<td>LC50</td>
<td>Lethal Concentration, 50 %</td>
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<tr>
<td>LEL</td>
<td>Lower Explosive Limit</td>
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<tr>
<td>MSDS</td>
<td>Material Safety Data Sheet</td>
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<tr>
<td>NFPA</td>
<td>National Fire Protection Association</td>
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<tr>
<td>MSHA</td>
<td>Mine Safety and Health Administration</td>
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<tr>
<td>NIOSH</td>
<td>National Institute for Occupational Safety and Health</td>
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<td>NIST</td>
<td>National Institute of Standards and Technology</td>
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<td>NRC</td>
<td>Nuclear Regulatory Commission</td>
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<td>NTP</td>
<td>National Toxicology Program</td>
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<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
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<tr>
<td>PEL</td>
<td>Permissible Exposure Limit</td>
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<tr>
<td>RCRA</td>
<td>Resource Conservation and Recovery Act</td>
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<td>REL</td>
<td>Recommended Exposure Limit</td>
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<tr>
<td>RM</td>
<td>Reference Material</td>
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<tr>
<td>RQ</td>
<td>Reportable Quantity</td>
</tr>
<tr>
<td>RTECS</td>
<td>Registry of Toxic Effects of Chemical Substances</td>
</tr>
<tr>
<td>SRM</td>
<td>Standard Reference Material</td>
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<tr>
<td>STEL</td>
<td>Short Term Exposure Limit</td>
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<tr>
<td>TDLo</td>
<td>Toxic Dose Low</td>
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<tr>
<td>TLV</td>
<td>Threshold Limit Value</td>
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<tr>
<td>TPQ</td>
<td>Threshold Planning Quantity</td>
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<tr>
<td>TSCA</td>
<td>Toxic Substances Control Act</td>
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<tr>
<td>TWA</td>
<td>Time Weighted Average</td>
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<tr>
<td>UEL</td>
<td>Upper Explosive Limit</td>
</tr>
<tr>
<td>WHMIS</td>
<td>Workplace Hazardous Materials Information System</td>
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</tbody>
</table>

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The certified values for this material are given in the NIST Certificate of Analysis.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmstds@nist.gov; or via the Internet at http://www.nist.gov/srm.