MILLER
AND COMPANY

Miller and Company LLC
9700 West Higgins Road
Suite 1000
Rosemont, Illinois 60018

Telephone Number: 847-696-2400

Updated: January 2, 2013

Product: **Milco 5 Carbon Raiser**

The subject product is a mechanical blend of one or more of the following raw material(s):

Potential Components

Calcined Anthracite(s)

Calcined Petroleum Coke(s)

Custom blended to specification at time of blending.

Since the mixture presents no greater hazard than any of the individual components, the Material Safety Data Sheets for the individual components are attached and satisfy the requirements of the data sheet for the mixture (Appendix A, Clarifications and Interpretations for the Hazard Communication Standard (HCS), OSHA CPL 2-2, 38B, 15 August 1988).

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MDL INFORMATION SYSTEMS, INC.
1281 Murfreesboro Road, Suite 300
Nashville, TN 37217-2423
1-615-366-2000

EMERGENCY TELEPHONE NUMBER:
1-800-424-9300 (NORTH AMERICA)
1-703-527-3887 (INTERNATIONAL)

SUBSTANCE: CALCINED ANTHRACITE COAL

TRADE NAMES/SYNONYMS:
COAL, ANTHRACITE, CALCINED; CALCINED ANTHRACITE; DEVOLATIZED ANTHRACITE; COAL DUST; COAL CALCINATE; OHS35039

CHEMICAL FAMILY: polynuclear, aromatic, hydrocarbons

CREATION DATE: Apr 20 1993
REVISION DATE: Oct 31 2007

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: CALCINED ANTHRACITE COAL
CAS NUMBER: 68187-59-7
EC NUMBER (EINECS): 269-111-1
PERCENTAGE: 100.0

COMPONENT: QUARTZ
CAS NUMBER: 14808-60-7
EC NUMBER (EINECS): 238-878-4
PERCENTAGE: >1

SECTION 3 HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=1 REACTIVITY=0

EC CLASSIFICATION (CALCULATED): Not determined.

EMERGENCY OVERVIEW:
COLOR: black
PHYSICAL FORM: solid
MAJOR HEALTH HAZARDS: cancer hazard (in humans)
PHYSICAL HAZARDS: Dust/air mixtures may ignite or explode.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: difficulty breathing, bluish skin color, lung damage, cancer
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: no information is available
EYE CONTACT:

SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: no information on significant adverse effects
INGESTION:
SHORT TERM EXPOSURE: no information on significant adverse effects
LONG TERM EXPOSURE: no information is available

CARCINOGEN STATUS:
OSHA: N
NTP: Y
IARC: Y

SECTION 4 FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then ge immediate medical attention.

INGESTION: If a large amount is swallowed, get medical attention.

SECTION 5 FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Slight fire hazard. Dust/air mixtures may ignite or explode.

EXTINGUISHING MEDIA: regular dry chemical, carbon dioxide, water, regular foa

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Do not scatter spilled material with high-pressure water streams. Dike for later disposal. Use extinguishing agents appropriate for surrounding fire. Avoid inhalation of material or combustion by-products. Stay upwind and kee out of low areas.

SECTION 6 ACCIDENTAL RELEASE MEASURES

WATER RELEASE:
Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

OCCUPATIONAL RELEASE:
Large spills: Collect spilled material in appropriate container for disposal. Avoid generating dust. Clean up residue with a high-efficiency particulate filter vacuum.

SECTION 7 HANDLING AND STORAGE

Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances.

Use methods to minimize dust.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
CALCINED ANTHRACITE COAL:
COAL DUST:
2 mg/m3 OSHA TWA (respirable particulate) (<5% crystalline silica)
0.1 mg/m3 OSHA TWA (respirable particulate) (>=5% crystalline silica)
2 mg/m3 UK OES TWA (respirable dust)

MEASUREMENT METHOD: Particulate filter; Gravimetric; NIOSH IV # 0600, Nuisance Dust (Respirable); ALSO # 7500

COAL DUST - ANTHRACITE:
0.4 mg/m3 ACGIH TWA (respirable particulate)

QUARTZ:
0.3 mg/m3 OSHA TWA (total particulate)
0.1 mg/m3 OSHA TWA (respirable particulate)
0.05 mg/m3 ACGIH TWA (respirable fraction)
0.05 mg/m3 NIOSH recommended TWA 10 hour(s) (respirable dust)
0.3 mg/m3 UK MEL TWA (respirable particulate)

MEASUREMENT METHOD: Particulate filter; Low-temperature ashing; X-ray diffraction spectrometry; NIOSH IV # 7500; ALSO # 7601, # 7602

VENTILATION: Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency ey wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use.
Any chemical cartridge respirator with organic vapor cartridge(s) and dust and mist filter(s).
Any chemical cartridge respirator with organic vapor cartridge(s) and high-efficiency particulate filter(s).
Any air-purifying respirator with a full facepiece, an organic vapor canister and a dust, mist, and fume filter.
Any powered, air-purifying respirator with a full facepiece and a

high-efficiency particulate filter.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: solid
COLOR: black
ODOR: Not available
BOILING POINT: Not applicable
MELTING POINT: Not available
VAPOR PRESSURE: Not applicable
VAPOR DENSITY: Not applicable
SPECIFIC GRAVITY: Not available
WATER SOLUBILITY: Not available
PH: Not applicable
VOLATILITY: Not applicable
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not applicable
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
FLASHPOINT: Not determined

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid generating dust.

INCOMPATIBILITIES: oxidizing materials, metals, metal salts, halogens, combustible materials, reducing agents, bases, acids

CALCINED ANTHRACITE COAL:
OXIDIZERS (STRONG): Fire and explosion hazard.

QUARTZ:
ALKALIES (STRONG): May be attacked.
CHLORINE TRIFLUORIDE: Possible explosion.
HYDROCHLORIC ACID: Exothermic reaction.
HYDROFLUORIC ACID: May be attacked.
MANGANESE TRIFUORIDE: Violent reaction.
METALS: May produce violent explosion.
OXIDIZERS (STRONG): Fire and explosion hazard.
OXYGEN TRIFUORIDE: Possible explosive reaction.
OZONE: Possible explosive reaction in presence of organic materials.
VINYL ACETATE: Vigorous reaction.
XENON HEXAFLUORIDE: Possible detonation.

COAL DUST:
OXIDIZERS (STRONG): Fire and explosion hazard.

HAZARDOUS DECOMPOSITION:

Thermal decomposition products: oxides of carbon

POLYMERIZATION: Will not polymerize.

SECTION 11 TOXICOLOGICAL INFORMATION

QUARTZ:
TOXICITY DATA:
16 mppcf/8 hour(s)-17.9 year(s) intermittent inhalation-human TCLo; 300 ug/m3/10 year(s) intermittent inhalation-human LCLo; 90 mg/kg intravenous-rat LDLo; 200 mg/kg intratracheal-rat LDLo; 40 mg/kg intravenous-mouse LDLo; >20 mg/kg intratracheal-mouse LD; 20 mg/kg intravenous-dog LDLo; 80 mg/m3/26 week(s) intermittent inhalation-rat TCLo; 108 mg/m3/6 hour(s)-3 day(s) intermittent inhalation-rat TCLo; 58 mg/m3/13 week(s) intermittent inhalation-rat TCLo; 1475 ug/m3/8 hour(s)-21 week(s) intermittent inhalation-mouse TCLo; 4932 ug/m3/24 hour(s)-39 week(s) continuous inhalation-mouse TCLo; 28 mg/m3/3 week(s) intermittent inhalation-guinea pig TCLo; 3 mg/m3/6 hour(s)-78 week(s) intermittent inhalation-hamster TCLo
CARCINOGEN STATUS: NTP: Known Human Carcinogen; IARC: Human Sufficient Evidence, Animal Sufficient Evidence, Group 1; EC: Category 2
Adenocarcinomas and squamous-cell carcinomas of the lung in rats were produced after inhalation or repeated intratracheal instillation of various forms of crystalline silica. Malignant lymphomas developed in rats after intrapleural and intraperitoneal injections of quartz suspensions and intrapleural injection of cristobalite and tridymite. Epidemiologic studies indicate lung cancer occurs more frequently among silicotics than in the general population.
ACUTE TOXICITY LEVEL: Insufficient Data.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: respiratory disorders
TUMORIGENIC DATA:
50 mg/m3 inhalation-rat TCLo/6 hour(s)-71 week(s) intermittent; 45 mg/kg intraperitoneal-rat TDLo; 90 mg/kg intravenous-rat TDLo; 90 mg/kg intrapleural-rat TDLo; 111 mg/kg intratracheal-rat TDLo; 100 mg/kg intratracheal-rat TDLo/19 week(s) intermittent; 900 mg/kg implant-rat TDLo; 4000 mg/kg implant-mouse TDLo; 83 mg/kg intrapleural-hamster TDLo; 90 mg/kg intraperitoneal-rat TD/4 week(s) intermittent; 450 mg/kg intraperitoneal-rat TD/4 week(s) intermittent; 4554 mg/kg implant-rat TD; 200 mg/kg intrapleural-rat TD; 100 mg/kg intrapleural-rat TD; 100 mg/kg intrapleural-rat TD; 100 mg/kg intrapleural-rat TD
MUTAGENIC DATA:
micronucleus test - human lung 40 ug/cm2; micronucleus test - hamster lung 160 ug/cm2
ADDITIONAL DATA: Smoking may enhance the toxic effects.

HEALTH EFFECTS:
INHALATION:
ACUTE EXPOSURE:
CALCINED ANTHRACITE COAL: May cause irritation.

QUARTZ: Exposure to high concentrations may cause physical discomfort of the upper respiratory tract.

CHRONIC EXPOSURE:
CALCINED ANTHRACITE COAL: Inhalation of anthracite coal dust for several

years may cause coal workers pneumoconiosis. Coal workers pneumoconiosis exists in 2 forms: Simple, which results from carbon particles alone, and complicated, from a mixture of particles resulting in progressive massive fibrosis. Simple pneumoconiosis is slow in onset with nonspecific symptoms including coughing, wheezing, dyspnea, and black sputum. Simple pneumoconiosis may occur concomitantly with chronic bronchitis and emphysema and is associated with minimal respiratory impairments. Diagnosis is made on the presence of small opacities on chest X-ray. As the simple pneumoconiosis progresses to an advanced stage, some reduction in ventilatory function may occur. Coal worker's pneumoconiosis appears to stop when exposure ceases, but progressive massive fibrosis may still develop. Complicated pneumoconiosis is diagnosed by large opacities on chest X-ray. Complicated pneumoconiosis is associated with reduction in ventilatory capacity, low diffusing capacity, abnormalities of gas exchange, low arterial oxygen tension, severe emphysema, pulmonary hypertension, right heart failure, and premature death. Tuberculosis and bacterial pneumonia are serious complications. Caplan's syndrome, depressed interferon activity, and cytotoxic effects have been reported. Freshness and increased surface area of dust particles increases cytotoxicity.

QUARTZ: Inhalation of very high concentrations of finely divided crystalline silica dust, exposure ranging from a few weeks to 4-5 years, may cause a rapidly developing silicosis, characterized by pulmonary insufficiency with severe dyspnea, violent coughing, tachypnea, weight loss, and cyanosis leading to the development of cor pulmonale and death within a relatively short period of time. A slowly developing silicosis may result from exposure for 6 months-30 years to relatively low levels of the dust. The first symptom is usually a slowly increasing, non-disabling exertional dyspnea due to pulmonary fibrosis and the emphysema associated with it. Continued exposure may increase the rate of progression of the disease. Also, the fibrogenic action may continue when exposure ceases. As the fibrosis advances, other symptoms may include shortness of breath, productive cough, wheezing, chest tightness or pain, marked weakness, decreased capacity for work, and repeated non-specific chest illnesses. Cyanosis, clubbing of digits, orthopnea, or serious weight loss are not usually evident until the disease is advanced. Pulmonary infections, which may be indicated by hemoptysis, and cardiac decompensation may exacerbate the symptoms. Three major complications, which are the most frequent causes of death, are pulmonary tuberculosis, respiratory insufficiency which is due to the massive emphysematous and fibrotic changes and is sometimes accompanied by chronic cor pulmonale, and acute bronchopulmonary infection. A number of studies have shown that persons diagnosed as having silicosis have an increased risk for dying from lung cancer. This increase has been seen among miners, quarry workers, foundry workers, ceramic workers, granite workers, and stone cutters. In some of these studies, the risk of lung cancer increased with the duration of employment. Various forms and preparations of crystalline silica produced adenocarcinomas and squamous cell carcinomas of the lungs in rats.

SKIN CONTACT:

ACUTE EXPOSURE:

CALCINED ANTHRACITE COAL: No data available.

QUARTZ: May cause irritation of intact skin due to mechanical abrasion. If the skin is abraded, a heavy growth of scar tissue may be induced.

CHRONIC EXPOSURE:
CALCINED ANTHRACITE COAL: No data available.

QUARTZ: No data available.

EYE CONTACT:
ACUTE EXPOSURE:
CALCINED ANTHRACITE COAL: No data available.

QUARTZ: May cause irritation due to mechanical action. Particles of silic in the range of 2-3 micrometers introduced into the corneal stroma of rabbit eyes caused very little reaction. These same particles introduced into the anterior chamber resulted in an inflammatory reaction in 3-5 weeks with the formation of fibrotic nodules in the iridocorneal angle. Finely divided silica injected into the vitreous of rabbit eyes has cause necrosis of the retina and atrophy of the choroid.

CHRONIC EXPOSURE:
CALCINED ANTHRACITE COAL: No data available.

QUARTZ: An abnormally high silicon content in the cornea, and a gradual decrease in visual acuity due to corneal opacities in the pupillary area, have been reported in a group of foundry workers.

INGESTION:
ACUTE EXPOSURE:
CALCINED ANTHRACITE COAL: No data available.

QUARTZ: Effects of ingestion are due to mechanical action as crystalline silicas are biologically inert.

CHRONIC EXPOSURE:
CALCINED ANTHRACITE COAL: No data available.

QUARTZ: No data available.

SECTION 12 ECOLOGICAL INFORMATION

Not available

SECTION 13 DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations.

SECTION 14 TRANSPORT INFORMATION

No classification assigned.

LAND TRANSPORT ADR/RID: No classification assigned.

AIR TRANSPORT IATA/ICAO: No classification assigned.

MARITIME TRANSPORT IMDG: No classification assigned.

SECTION 15 REGULATORY INFORMATION

U.S. REGULATIONS:
TSCA INVENTORY STATUS: Y

TSCA 12(b) EXPORT NOTIFICATION: Not listed.
CERCLA SECTION 103 (40CFR302.4): N
SARA SECTION 302 (40CFR355.30): N
SARA SECTION 304 (40CFR355.40): N
SARA SECTION 313 (40CFR372.65): N
SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40CFR370.21):
ACUTE: N
CHRONIC: Y
FIRE: N
REACTIVE: N
SUDDEN RELEASE: N
OSHA PROCESS SAFETY (29CFR1910.119): N
STATE REGULATIONS:
California Proposition 65: Y
Known to the state of California to cause the following:
Silica, crystalline (airborne particles of respirable size)
Cancer (Oct 01, 1988)
EUROPEAN REGULATIONS:
EC NUMBER (EINECS): 269-111-1

SECTION 16 OTHER INFORMATION

MATERIAL SAFETY DATA SHEET

SRM Supplier: **National Institute of Standards and Technology**
Standard Reference Materials Program
100 Bureau Drive, Stop 2321
Gaithersburg, Maryland 20899-2321

SRM Number: 2719
MSDS Number: 2719
SRM Name: Calcined Petroleum Coke
Date of Issue: 20 May 2002

MSDS Coordinator: Carmen S. Davis
Phone: (301) 975-6776
ChemTrec: 1-800-424-9300

FAX: (301) 926-4751
E-mail: SRMMSDS@nist.gov

SECTION I. MATERIAL IDENTIFICATION

Material Name: Calcined Petroleum Coke

Description: SRM 2719 consists of 50 g of calcined petroleum coke ground to pass a 250 μm (60 mesh) sieve, homogenized, and bottled under an argon atmosphere.

Other Designations: **Calcined Petroleum Coke** (calcined; petroleum coke, calcined)

Name	Chemical Formula	CAS Registry Number
Calcined Petroleum Coke	complex molecule	64743-05-1

DOT Classification: Not hazardous by DOT regulations

Manufacturer/Supplier: Available from a number of suppliers

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Component	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Calcined Petroleum Coke	~100	No occupational exposure limits established

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Calcined Petroleum Coke	
Appearance and Odor: black solid with varying odor	**Melting Point:** not available
Relative Molecular Weight: complex molecule	**Vapor Pressure:** not applicable
Specific Gravity (Water = 1): 2.1	**Vapor Density:** not available
Boiling Point: not applicable	**pH:** not available
Water Solubility: insoluble	**Solvent Solubility:** not available

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable **Method Used:** Not Applicable **Autoignition Temperature:** Not Available

Flammability Limits in Air (Volume %): **UPPER:** Not Applicable
LOWER: Not Applicable

Unusual Fire and Explosion Hazards: This material is a slight fire hazard. Dust/air mixtures may ignite or explode. Calcined petroleum coke, with strong oxidizers, presents a fire and explosion hazard.

Extinguishing Media: Use extinguishing agents that are appropriate to the surrounding fire.

Special Fire Procedures: Fire fighters should wear self-contained breathing apparatus (SCBA) and protective clothing when fighting fires involving materials of this type.

SECTION V. REACTIVITY DATA

Stability: __X__ **Stable** ____ **Unstable**

Conditions to Avoid: Avoid generating dust and contact with incompatible materials.

Incompatibility (Materials to Avoid): Calcined Petroleum coke is incompatible with oxidizing materials.

See Section IV: *Fire and Explosion Hazard Data*

Hazardous Decomposition or Byproducts: Thermal decomposition products may include oxides of carbon, sulfur, and hydrocarbons.

Hazardous Polymerization: ____ **Will Occur** __X__ **Will Not Occur**

SECTION VI. HEALTH HAZARD DATA

Route of Entry: __X__ **Inhalation** __X__ **Skin** __X__ **Ingestion**

Health Hazards (Acute and Chronic): Inhalation of calcined petroleum coke may irritate the respiratory tract. Repeated or prolonged exposure to coke dust may aggravate an existing bronchitis due to other causes such as infectious diseases or smoking. Chronic inhalation of high levels may result in a mild lung fibrosis. Eye and/or skin exposure to this material may cause irritation due to abrasiveness.

Medical Conditions Generally Aggravated by Exposure: This material may aggravate existing respiratory disorders.

Listed as a Carcinogen/Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	____	X
In the International Agency for Research on Cancer (IARC) Monographs	____	X
By the Occupational Safety and Health Administration (OSHA)	____	X

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance if necessary.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration. Obtain medical assistance if necessary.

Ingestion: If ingestion occurs, wash out mouth with water. Obtain medical assistance if necessary.

TARGET ORGAN(S) OF ATTACK: upper respiratory tract (URT)

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Notify safety personnel of major spills and/or leaks. Shut off sources of ignition. Evacuate all nonessential personnel. Avoid raising dust. Recover small spills with a clean shovel and place into a clean, dry container for later disposal. For larger spills, wet the area with water and dike the material for later disposal. Clean up remaining residue using a high efficiency particulate filter.

Waste Disposal: Follow all federal, state, and local regulations.

Handling and Storage: Persons handling this material should wear an air purifying respirator with a high efficiency particulate filter. The specific respirator selected must be based on contamination levels found in the workplace, must be based on the specific operation, must **NOT** exceed the working limits of the respirator, and must be jointly approved by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA). Additional protective clothing, such as gloves, lab coats, and splash-proof or dust-resistant safety goggles should be worn.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

Store material in a cool, dry, well ventilated area away from flames, sources of ignition, and incompatible materials.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *Petroleum Coke, Calcined*, 22 March 2001.
Merck Index, 11th Ed., 1989.
The Sigma Aldrich Library of Chemical Safety Data, Ed. II, 1988.