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NEMA STANDARDS PUBLICATIONS NO. CB 3

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Guidelines for Preparation of Material Safety Data Sheets for Carbon and Graphite Products

NEMA

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION ■ 2101 L STREET, N.W., WASHINGTON, D.C. 20037

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CB 3

GUIDELINES FOR PREPARATION OF MATERIAL SAFETY DATA SHEETS FOR CARBON AND GRAPHITE PRODUCTS

Published by:

National Electrical Manufacturers Association
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Foreword

User needs have been considered throughout the development of this Standards Publication.

This Standards Publication, which has been developed by the Carbon Section of the National Electrical Manufacturers Association, will be reviewed periodically for the purpose of assuring compatibility with current OSHA and EPA regulations.

Please address any comments or questions regarding the text of this publication to:

Vice President, Engineering Department
National Electrical Manufacturers Association
2101 L Street, N.W., Suite 300
Washington, D.C. 20037

Scope

This publication defines those physical and chemical properties which are relevant to the material characterization of graphites used in the semiconductor industry. No attempt has been made to incorporate in these standards any application performance standards relative to semiconductor graphites.

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(This Standards Publication has been approved by NEMA as Authorized Engineering Information)

SECTION 1

1.1 General

This document provides examples of Material Safety Data Sheets for five typical carbon and graphite procedures in a format understood to be acceptable to the Occupational Health and Safety Administration. The examples shown in Appendices A, B, C, D, and E are included solely for illustrative purposes.

The wide variety of carbon and graphite products and the extensive array of materials which can be contained in a number of these products makes it impractical to provide Material Safety Data Sheets in this publication for all types. However, the examples shown in the Appendices provide a cross-section of product types and basic information which can be adopted for inclusion in Material Safety Data Sheets for other carbon and graphite products.

Authorized Engineering Information 11-15-1990.

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APPENDIX A

MATERIAL SAFETY DATA SHEET EXAMPLE
SYNTHETIC GRAPHITE

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Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard. 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor

Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List)	Note: Blank spaces are not permitted. If any form is not applicable, or no information is available, the space must be marked to indicate that.
Synthetic Graphite	

Section I

Manufacturer's Name	Emergency Telephone Number
Address (Number, Street, City State, and Zip Code)	Telephone Number for Information
	Date Prepared
	Signature of Preparer (Optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity: Common Name(s)):	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
Synthetic Graphite CAS# 7782-42-5	10mg/M^3	10mg/M^3	5mg/M^3	> 99
	Total Dust	Total Dust	Respirable	

Section III — Physical/Chemical Characteristics

Boiling Points Does not boil, sublimes at	>3000°C	Specific Gravity (H_2O = 1) (To be filled in by Mfgr.)	N/A
Vapor Pressure (mm Hg.) Negligible at room temperature	N/A	Melting Point Does not melt	N/A
Vapor Density (AUR = 1) Normally solid	N/A	Evaporation Rates (Butyl Acetate = 1) N/A	N/A

Solubility in Water
Insoluble

Appearance and Odor
Gray-Black solid, No odor.

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
Does not flash		N/A	N/A

Extinguishing Media
Use appropriate media for combustible material (sand, water, CO_2, etc.)

Special Fire Fighting Procedures
Use self-Contained breathing apparatus, as normal.

Unusual Fire and Explosion Hazards
Graphite dust is normally not explosive, but it may weakly contribute it the event is initiated by another explosive dust or gas.

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Section V—Reactivity Data

Stability	Unstable		Conditions to Avoid N/A
	Stable	X	

Incompatibility (Materials to Avoid)
Strong oxidizing media, will oxidize slowly in air at temperature of 400°C or greater

Hazardous Decomposition or Byproducts
Graphite combustion produces CO and CO_2 gases.

Hazardous Polymerization	May Occur		Conditions to Avoid N/A
	Will Not Occur	X	

Section VI—Health Hazard Data

Route(s) of Entry: Inhalation? Yes, as dust | Skin? No | Ingestion? Unlikely

Health Hazards (Acute and Chronic)
Prolonged and repeated over exposure to dust may lead to pneumconiosis. Dust particles may cause mechanical irritation to the eyes and skin.

Carcinogenicity: N/A | NTP? No | IARC Monographs? No | OSHA Regulated? No

Signs and Symptoms of Exposure
As typical for a nuisance dust. Acute effects are not expected for graphite exposure.

Medical Conditions Generally Aggravated by Exposure
Individuals with pre-existing chronic respiratory impairment or with serum antitrypsin dificiency may be at increased risk of penumoconiosis if prolonged and repeated overexposures to dust occur.

Emergency and First Aid Procedures
If in eyes, flush with water. Seek medical attention if irritation persists.
Normal hygienic practices are generally adequate. Treat symptomatically.

Section VII—Precautions for Safe Handling and Use

Steps To Be Taken in Case Material is Released or Spilled
Normal housekeeping practices; sweep, shovel or vacuum cleanup.

Water Disposal Method
Subject to local, state, and federal regulations for solid waste disposal.

Precautions To Be Taken in Handling and Storing
Graphite is electrically conductive; dust accumulations may cause electrical short circuits or other malfunctions.

Other Precautions
N/A

Section VIII—Control Measures

Evaporatory Protection (Specify Type)
NIOSH Approved type if TLV or PEL is exceeded

Ventilation	Local Exhaust: Dust collection when machining	Special: N/A	
	Mechanical (General): N/A	Other: N/A	
Protective Gloves: N/A		Eye Protection: Yes.	

Other Protective Clothing or Equipment
Normal work clothing

Work Hygenic Practices
No special requirements.

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APPENDIX B

MATERIAL SAFETY DATA SHEET SAMPLE
GRAPHITE WITH COAL TAR PITCH

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Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard. 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor

Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List)	Note: Blank spaces are not permitted. If any form is not applicable, or no information is available, the space must be marked to indicate that.
Graphite with Coal Tar Pitch	

Section I

Manufacturer's Name	Emergency Telephone Number
Address (Number, Street, City State, and Zip Code)	Telephone Number for Information
	Date Prepared
	Signature of Preparer (Optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity: Common Name(s)):	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
1. Synthetic Graphite CAS# 7782-42-5	10mg/M^3 Total Dust	10mg/M^3 Total Dust	5mg/M^3 Respirable Dust	> 99
2. Coal Tar Pitch CAS# 65996-93-2 (Benzene Soluable Fraction)	0.2mg/M^3	0.2mg/M^3	0.1mg/M^3	<1

Section III — Physical/Chemical Characteristics

Boiling Points Graphite: Sublimes at Coal Tar Pitch	>3000°C >340°C	Specific Gravity (H_2O = 1) (To be filled in by Mfgr.)	N/A
Vapor Pressure (mm Hg.) Graphite: Coal Tar Pitch	Negligable <1mmHg	Melting Point Graphite: Coal Tar Pitch: (Consult Mfgr.)	None 120°C
Vapor Density (AUR = 1) Normally Solid	N/A	Evaporation Rates (Butyl Acetate = 1) N/A	N/A

Solubility in Water
Insoluable

Appearance and Odor
Gray-Black solid, No odor

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used) Graphite does not flash Coal Tar Pitch: 120°C-200°C (Consult Mfgr.)	Flammable Limits	LEL N/A	UEL N/A

Extinguishing Media
Use appropriate media for combustible material (sand, water, CO_2, etc.)

Special Fire Fighting Procedures
Use self-contained breathing apparatus as normal

Unusual Fire and Explosion Hazards
Graphite dust is normally not explosive, but it may weakly contribute it the event is initiated by another explosive dust or gas.

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Section V—Reactivity Data

Stability			Conditions to Avoid
	Unstable		N/A
	Stable	X	

Incompatibility (Materials to Avoid) Strong Oxidizing media, will oxidize slowly at in air at temperature of 400°C or greater

Hazardous Decomposition or Byproducts Combustion produces CO and CO_2 gases

Hazardous Polymerization			Conditions to Avoid
	May Occur		N/A
	Will Not Occur	X	

Section VI—Health Hazard Data

Route(s) of Entry: Inhalation? Yes, as dust or coal tar volatiles — Skin: Yes — Ingestion? N/A

Health Hazards (Acute and Chronic)
Prolonged and repeated over exposure to dust may lead to pneumoconiosis.

Dust particles may cause mechanical irritation to eyes and skin. Coal tar pitch volatiles are eye and skin irritants and photosensitizers.

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?
Coal Tar Pitch	Yes	Yes	No
Graphite	No	No	No

Signs and Symptoms of Exposure
As typical for nuisance dust. Acute effects are not expected for graphite exposure. Coal tar pitch-possible skin and eye irritation.

Medical Conditions Generally Aggravated by Exposure Individuals with pre-existing chronic respiratory impairments or with serum antitrypsin deficiency may be at risk of pneumoconiosis if prolonged and repeated over exposure to dust occur.

Emergency and First Aid Procedures
Coal tar pitch can cause increased photosensitivity. If in eyes flush with water. Seek medical attention if irritation persists. Normal hygienic practices are adequate. Treat symptomatically.

Section VII—Precautions for Safe Handling and Use

Steps To Be Taken In Case Material Is Released or Spilled
Normal housekeeping practices; sweep, shovel or vacuum cleanup.

Water Disposal Method
Subject to Local, State and Federal regulations for solid waste disposal.

Precautions To Be Taken in Handling and Storing
Graphite is electrically conductive; dust accumulations may cause electrical short circuits or other malfunctions.

Other Precautions
N/A

Section VIII—Control Measures

Evaporatory Protection (Specify Type)
NIOSH approved type of TLV or PEL is exceeded.

Ventilation		
	Local Exhaust: Dust collection when machining	Special: Local ventilation if heated to fume point.
	Mechanical (General): N/A	Other: N/A

Protective Gloves	Eye Protection
Yes, adequate to prevent skin contact.	Yes

Other Protective Clothing or Equipment
Normal work clothing; long sleeves suggested.

Work Hygenic Practices
Assure adequate changes and laundering of work clothing to prevent skin irritation. Use of barrier creams may provide protection from skin irritation. Wash skin throughly with soap and water.

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APPENDIX C

MATERIAL SAFETY DATA SHEET SAMPLE
SYNTHETIC GRAPHITE POWDERS (GRANULES, FLOWS, AND PARTICLES)

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Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard. 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor

Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List) Synthetic Graphite Powders (granules, Flours, Particles)	Note: Blank spaces are not permitted. If any form is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name	Emergency Telephone Number
Address (Number, Street, City State, and Zip Code)	Telephone Number for Information
	Date Prepared
	Signature of Preparer (Optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity: Common Name(s)):	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
Synthetic Graphite CAS# 7782-42-5	10mg/M^3 Total Dust	10mg/M^3 Total Dust	5mg/M^3 Respirable Dust	> 99

Section III — Physical/Chemical Characteristics

Boiling Points Does not boil, sublimes at	>3000°C	Specific Gravity (H_2O = 1) (To be filled in by Mfgr.)	N/A
Vapor Pressure (mm Hg.) Negligible at room temperature	N/A	Melting Point N/A	N/A
Vapor Density (AUR = 1) Normally solid	N/A	Evaporation Rates (Butyl Acetate = 1) N/A	N/A

Solubility in Water
Insoluble

Appearance and Odor
Gray-Black powders, No odor.

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
Does not flash		N/A	N/A

Extinguishing Media
Use appropriate media for combustible material (sand, water, CO_2, etc.)

Special Fire Fighting Procedures
Use self-contained breathing apparatus, as normal.

Unusual Fire and Explosion Hazards
Graphite dust is normally not explosive, but it may weakly contribute if the event is initiated by another explosive dust or gas.

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Section V—Reactivity Data

Stability			Conditions to Avoid
	Unstable		N/A
	Stable	X	

Incompatibility (Materials to Avoid) Strong oxidizing media, will oxidize slowly in air at temperature of 400°C or greater.

Hazardous Decomposition or Byproducts Thermal decomposition may produce CO and CO_2 gases.

Hazardous Polymerization			Conditions to Avoid
	May Occur		N/A
	Will Not Occur	X	

Section VI—Health Hazard Data

Route(s) of Entry: Inhalation?	Skin	Ingestion?
Yes, as dust	No	N/A

Health Hazards (Acute and Chronic)
Prolonged and repeated over exposure to dust may lead to pneumoconiosis. Dust particles may cause mechanical irritation to the eyes and skin.

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?
N/A	No	No	No

Signs and Symptoms of Exposure
As typical for nuisance dust.

Medical Conditions Generally Aggravated by Exposure Individuals with pre-existing respiratory impairments or with serum antitrypsin may be at increased risk of pneumoconiosis if prolonged and repeated over exposure to dust occur.

Emergency and First Aid Procedures
If in eyes flush with water. Seek medical attention if irritation persists. Normal hygienic practices are adequate. Treat symptomatically.

Section VII—Precautions for Safe Handling and Use

Steps To Be Taken in Case Material is Released or Spilled
Normal housekeeping practices; sweep, shovel or vacuum cleanup.

Water Disposal Method
Subject to Local, State, and Federal regulations for solid waste disposal.

Precautions To Be Taken in Handling and Storing
Graphite dust is electrically conductive; dust accumulations may cause electrical short circuits or other malfunctions.

Other Precautions
N/A

Section VIII—Control Measures

Evaporatory Protection (Specify Type)
NIOSH approved type for dust if TLV or PEL is exceeded.

Ventilation			
	Local Exhaust: Dust collection when handling	Special: N/A	
	Mechanical (General): N/A	Other: N/A	
Protective Gloves: N/A		Eye Protection: Yes	

Other Protective Clothing or Equipment
Normal work clothing

Work Hygenic Practices Work clothing should be routinely laundered. Wash skin throughly with soap and water.

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APPENDIX D

MATERIAL SAFETY DATA SHEET SAMPLE
SYNTHETIC GRAPHITE WITH COPPER

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Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard. 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor

Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List)	Note: Blank spaces are not permitted. If any form is not applicable, or no information is available, the space must be marked to indicate that.
Synthetic Graphite with Copper	

Section I

Manufacturer's Name	Emergency Telephone Number
Address (Number, Street, City State, and Zip Code)	Telephone Number for Information
	Date Prepared
	Signature of Preparer (Optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity: Common Name(s)):	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
1. Synthetic Graphite CAS# 7782-42-5	$10mg/M^3$ Total Dust	$10mg/M^3$ Total Dust	$5mg/M^3$ Respirable Dust	-
2. *Copper CAS#7-40-50-8	$1.0mg/M^3$ Dust & Mist	$1.0mg/M^3$ Dust & Mist	-	-
	$0.1mg/M^3$ Fume	$0.2mg/M^3$ Fume	-	-

*Copper is the critical component in this mixture for assessment of hazards.

(Subject to the reporting requirements of section 313 of Title III and of 40 CFR 372)

Section III — Physical/Chemical Characteristics

Boiling Points Copper	2300°C	Specific Gravity (H_2O = 1) (To be filled in by Mfgr.)	N/A
Vapor Pressure (mm Hg.)	N/A	Melting Point Copper	
Vapor Density (AUR = 1)	N/A	Evaporation Rates (Butyl Acetate = 1)	

Solubility in Water
Insoluble

Appearance and Odor
Gray or red/brown solid with negligible odor (mixture).

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
N/A		N/A	N/A

Extinguishing Media
Use appropriate media for combustible material (sand, water, CO_2, etc.)

Special Fire Fighting Procedures
Use self-contained breathing apparatus, as normal.

Unusual Fire and Explosion Hazards
Normally not explosive but may weakly contribute if the event is initiated by another explosive dust or gas.

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Section V—Reactivity Data

D2

Stability			Conditions to Avoid
	Unstable		N/A
	Stable	X	

Incompatibility (Materials to Avoid)

Strong oxidizing media.

Hazardous Decomposition or Byproducts Combustion produces CO, CO_2, and copper fume/ozides

Hazardous Polymerization			Conditions to Avoid
	May Occur		N/A
	Will Not Occur	X	

Section VI—Health Hazard Data

Route(s) of Entry:	Inhalation?	Skin	Ingestion?
	Yes	Yes	N/A

Health Hazards (Acute and Chronic)

Breathing of copper dust/fume may cause metal fume fever, a metallic taste, irritation of the upper respiratory tract and vomiting. Possible temporary discolorization of skin. Dust particles may cause mechanical irritation to eyes and skin.

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?
N/A	No	No	No

Signs and Symptoms of Exposure

Metal fume fever - nausea, vomiting and dizziness

Medical Conditions Generally Aggravated by Exposure Individuals with Wilson's disease should not be exposed to copper fumes, dust or mist. Individuals with pre-existing respiration impairments or with serum antitrypsin may be at increased risk of pneumoconiosis if prolonged and repeated over exposure to dust occur.

Emergency and First Aid Procedures

Inhalation: Remove victim to fresh air; treat symptomatically.
Ingestion: If victim is conscious give large amounts of water; manually induce vomiting and seek medical attention.

Section VII—Precautions for Safe Handling and Use

Steps To Be Taken in Case Material is Released or Spilled

Normal housekeeping practices; sweep, shovel or vacuum cleanup.

Water Disposal Method

Subject to Local, State and Federal regulations for solid waste disposal.

Precautions To Be Taken in Handling and Storing

Graphite dust is electrically conductive; dust accumulations may cause electrical short circuits or other malfunctions.

Other Precautions

N/A

Section VIII—Control Measures

Evaporatory Protection (Specify Type)

NIOSH approved type for dust if TVL or PEL is exceeded.

Ventilation			
	Local Exhaust	Special	
	Dust collection when machining		N/A
	Mechanical (General)	Other	
	N/A		N/A
Protective Gloves		Eye Protection	
	N/A		Yes

Other Protective Clothing or Equipment

Other work clothing.

Work Hygenic Practices

Work clothing should be routinely laundered. Normal hygine practices are usually adequate.

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APPENDIX E

MATERIAL SAFETY DATA SHEET SAMPLE
NATURAL GRAPHITE WITH COPPER

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Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard. 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor

Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List)	Note: Blank spaces are not permitted. If any form is not applicable, or no information is available, the space must be marked to indicate that.
Natural Graphite with Copper	

Section I

Manufacturer's Name	Emergency Telephone Number
Address (Number, Street, City State, and Zip Code)	Telephone Number for Information
	Date Prepared
	Signature of Preparer (Optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity: Common Name(s)):	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
1. Natural Graphite CAS# 7782-42-5	$2.5mg/M^3$ Total Dust	$2.5mg/M^3$ Total Dust	-	-
2. *Copper CAS# 7440-50-8	$1.0mg/M^3$ Dust & Mist	$1.0mg/M^3$ Dust & Mist	-	-
	$0.1mg/M^3$ Fume	$0.2mg/M^3$ Fume	-	-

*Copper is the critical component in this mixture for assessment of hazards.
(Subject to the reporting requirements of section 313 of Title III and of 40 CFR 372)

Section III — Physical/Chemical Characteristics

Boiling Points Copper	2300°C	Specific Gravity (H_2O = 1) (To be filled in my Mfgr.)	N/A
Vapor Pressure (mm Hg.)	N/A	Melting Point Copper	1083°C
Vapor Density (AUR = 1)	N/A	Evaporation Rates (Butyl Acetate = 1)	N/A

Solubility in Water
Insoluble

Appearance and Odor
Gray to red/brown solid with negligible odor (mixture).

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
N/A		N/A	N/A

Extinguishing Media
Use appropriate media for combustible material (sand, water, CO_2, etc.)

Special Fire Fighting Procedures
Use self-contained breathing apparatus, as normal.

Unusual Fire and Explosion Hazards
Normally not explosive but may weakly contribute if the event is initiated by another explosive dust or gas.

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Section V—Reactivity Data

E2

Stability			Conditions to Avoid
	Unstable		N/A
	Stable	X	

Incompatibility (Materials to Avoid)
Strong oxidizing media.

Hazardous Decomposition or Byproducts

Hazardous Polymerization			Conditions to Avoid
	May Occur		N/A
	Will Not Occur	X	

Section VI—Health Hazard Data

Route(s) of Entry:	Inhalation?	Skin	Ingestion?
	Yes	Yes	N/A

Health Hazards (Acute and Chronic)
Breathing ofcopper dust/fume may cause metal fume fever, a metallic taste, irritation of the upper respiratory tract and vomiting. Possible temporary discoloration of the skin. Dust particles may cause mechanical irritation of the eyes and skin.

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?
N/A	No	No	No

Signs and Symptoms of Exposure
Metal Fume fever - nausea, vomiting and dizziness

Medical Conditions Generally Aggravated by Exposure
Individuals with Wilson's disease should not be exposed to copper fumes, dust or mist. Individuals with pre-existing respiratory impairments or with serum antitrypsin may be at increased risk of pneumoconiosis if prolonged and repeated over exposure to dust occur.

Emergency and First Aid Procedures
Inhalation: Remove victim to fresh air; treat symptomatically.
Ingestion: If victim is conscious give large amounts of water; manually induce vomiting and seek medical attention.

Section VII—Precautions for Safe Handling and Use

Steps To Be Taken in Case Material is Released or Spilled
Normal housekeeping practic; sweep, shovel or vacuum cleanup.

Water Disposal Method
Subject to Local, State and Federal regulations for solid waste disposal.

Precautions To Be Taken in Handling and Storing
Graphite dust is electrically conductive; dust accumulations may cause electrical short circuits or other malfunctions.

Other Precautions
N/A

Section VIII—Control Measures

Evaporatory Protection (Specify Type)
NIOSH approved type for dust if TVL or PEL is exceeded.

Ventilation			
	Local Exhaust	Special	
	Dust collection when machining		N/A
	Mechanical (General)	Other	
	N/A		N/A
Protective Gloves		Eye Protection	
	N/A		Yes

Other Protective Clothing or Equipment
Other work clothing

Work Hygenic Practices
Work clothing should be routinely laundered. Normal hygienic practices are usually adequate.

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NEMA STANDARDIZATION

The purpose of NEMA Standards, their classification and status are set forth in certain clauses of the NEMA *Standardization Policies and Procedures* manual and are referenced below:

Purpose of Standards

National Electrical Manufacturers Association Standards are adopted in the public interest and are designed to eliminate misunderstandings between the manufacturer and the purchaser and to assist the purchaser in selecting and obtaining the proper product for their particular needs. Existence of a National Electrical Manufacturers Association Standard does not in any respect preclude any member or nonmember from manufacturing or selling products not conforming to the standard.

(Standardization Policies and Procedures, p. 1)

Definition of a Standard

A standard of the National Electrical Manufacturers Association defines a product, process or procedure with reference to one or more of the following: nomenclature, composition, construction, dimensions, tolerances, safety, operating characteristics, performance, rating, testing, and the service for which they are designed.

(Standardization Policies and Procedures, p. 2)

Dimensions

Where dimensions are given for interchangeability purposes, alternate dimensions satisfying the other provisions of the Standards Publication may be capable of otherwise equivalent performance.

(Standardization Policies and Procedures, p. 8)

Categories of Standards

National Electrical Manufacturers Association Standards are of three classes:

1. NEMA Standard, which relates to a product, process or procedure commercially standardized and subject to repetitive manufacture, which standard has been approved by at least 90 percent of the members of the Subdivision eligible to vote thereon;
2. Suggested Standard for Future Design, which may not have been regularly applied to a commercial product, but which suggests a sound engineering approach to future development, which standard has been approved by at least two-thirds of the members of the Subdivision eligible to vote thereon.
3. Adoptive Standard, which is adopted in whole or in part from the standards of another organization, either domestic, regional, or international.

(Standardization Policies and Procedures, pp 7 & 16)

Authorized Engineering Information

Authorized Engineering Information consists of explanatory data and other engineering information of an informative character not falling within the classification of NEMA Standard or Suggested Standard for Future Design, which standard has been approved by at least two-thirds of the members of the Subdivision eligible to vote on the standard.

(Standardization Policies and Procedures, pp. 7 & 16)

Official Standards Proposal

An Official Standards Proposal is an official draft of a proposed standard which is formally recommended to an outside organization(s) for consideration, comment and/or approval, and which has been approved by at least 90 percent of the members of the Subdivision eligible to vote thereon. *(Standardization Policies and Procedures, pp 7 & 16)*

Identification of Status

Standards in NEMA Standards Publications are identified in the foreword or following each standard as "NEMA Standard" or "Suggested Standard for Future Design." These indicate the status of the standard. These words are followed by a date which indicates when the standard was adopted in its present form by the Association.

The material identified as "Authorized Engineering Information" and "Official Standards Proposal" is designated similarly.

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