

Material Safety Data Sheet

Material Name: AmberStrand® Silver Clad Fiber

***** Section 1 - Chemical Product and Company Identification *****

Manufacturer Information

Syscom Advanced Materials, Inc.
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Emergency # 800-424-9300 CHEMTREC

***** Section 2 - Hazards Identification *****

Emergency Overview

AmberStrand®-Z-Ag metal clad PBO fiber is a whitish-silvery or grey yarn. As shipped, these fibers pose no immediate hazard. Extreme mechanical processing and handling, such as grinding or breaking, can produce airborne respirable fibrils (subfibers) of the polymer core fiber. Animal studies indicate that prolonged overexposure of such fibrils has the potential for lung damage. Use ventilation or a respirator to minimize fibril inhalation if conducting extreme mechanical processing.

Less extreme mechanical processing, such as braiding, weaving, sewing, or knitting, can produce low levels of dust and short sections of fiber or fuzz containing nickel, but have not produced measurable fibrils.

Nickel, especially its salts, has been reported as causing cancer in laboratory animals. Overexposure to metal dust may cause "metal fume fever" (see inhalation below). Use ventilation or a respirator to avoid breathing dust, fibers, or fuzz.

Copper ingestion causes nausea, vomiting, abdominal pain, metallic taste, and diarrhea. Ingestion of large doses may cause stomach and intestinal ulceration, jaundice, and kidney and liver damage.

Avoid skin contact, as nickel can be a skin sensitizer.
Decomposes and emits toxic fumes at higher than 600C.

AmberStrand® fibers are non-biodegradable.
Since it is high strength, the fiber can severely cut fingers or skin.

Potential Health Effects: Eyes

Fiber fly and dust may cause slight mechanical irritation.

Potential Health Effects: Skin

Continuous rubbing of fibers and fiber pieces on the skin (as when trapped under cuffs or collar, or when constantly handling fabrics) may cause irritation. Based on Zylon® MSDS data sheet few adverse human health effects are anticipated from contact with the base polymer fiber. But prolonged exposure to nickel may produce dermatitis. Prolonged skin exposure to silver may cause discoloration. Minimize skin contact. Additionally, exposure to copper or copper dust may cause skin greenish-black discoloration.

Potential Health Effects: Ingestion

Ingestion of nickel may cause nausea, vomiting, headaches, dizziness or gastrointestinal irritation.

Potential Health Effects: Inhalation

AmberStrand® fiber is too big to inhale into the lungs, but fiber dust and fly or segments if filaments may be breathed into the nose or throat. Working unprotected in dusty conditions may cause respiratory irritation and cold-like symptoms.

HMIS Ratings: Health: 1 Fire: 0 HMIS Reactivity 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

***** Section 3 - Composition / Information on Ingredients *****

CAS #	Component	Percent
60857-81-0	1,4-Benzenedicarboxylic acid, polymer with 4,6-diamino-1,3-benzenediol dihydrochloride	5-80

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7440-22-4	Silver	10-70
7440-02-0	Nickel	10-70
7440-50-8	Copper	0-80
7732-18-5	Water	0-2

*** Section 4 - First Aid Measures ***

First Aid: Eyes

In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician if irritation persists or develops later.

First Aid: Skin

If fibers irritate the skin, wash with soap and water. Wash contaminated clothing before reuse. Use hand creams to soothe and moisten irritated skin. Get medical attention if irritation persists after contact stops.

First Aid: Ingestion

Not a probable route. However, in case of gastro-intestinal distress following accidental ingestion, call a physician.

First Aid: Inhalation

If large amounts of fumes, dust, or fibers are inhaled, remove to fresh air. If breathing is difficult, give oxygen and call a physician. If persistent cough or other symptoms develop, get medical attention.

*** Section 5 - Fire Fighting Measures ***

General Fire Hazards

See Section 9 for Flammability Properties.

At high temperatures, metal can melt, and continuous heating could produce metal vapor.

Hazardous Combustion Products

Base fiber decomposes and emits toxic fumes such as hydrogen cyanide under fire or in environments above 600 degrees C (1,112 degrees F).

Extinguishing Media

Treat as metal fire. Use foam, dry chemical, CO2 fire extinguisher, or metal extinguishing powder.

DO NOT APPLY WATER TO A METAL FIRE.

Fire Fighting Equipment/Instructions

Wear self-contained breathing apparatus and protective clothing at large scale fires. Keep personnel removed and upwind of fire.

NFPA Ratings: Health: 1 Fire: 0 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

*** Section 6 - Accidental Release Measures ***

Containment Procedures

Review FIRE FIGHTING MEASURES and PERSONNEL PROTECTION before proceeding with clean up. Use appropriate personal protective equipment during clean up. Can severely cut or even sever fingers when entangled.

Clean-Up Procedures

Wash, shovel, mop-up and place in solid waste containers. Fiber is not biodegradable; do not flush to drains.

Evacuation Procedures

Isolate area. Keep unnecessary personnel away.

Special Procedures

None necessary.

*** Section 7 - Handling and Storage ***

Handling Procedures

Since high strength fiber can severely cut or even sever fingers, avoid touching a moving thread line. Avoid entanglement in a moving thread line as bodily injury may result. Avoid skin contact with the nickel on the surface of the fibers, as it can sensitize the skin.

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Storage Procedures

No special storage conditions. Protect metals from atmosphere likely to cause corrosion or oxidation of metal.

* * * Section 8 - Exposure Controls / Personal Protection * * *

A: Component Exposure Limits

Nickel (7440-02-0)

ACGIH: 1.5 mg/m3 TWA (inhalable fraction)
OSHA: 1 mg/m3 TWA
NIOSH: 0.015 mg/m3 TWA

Silver (7440-22-4)

ACGIH: 0.1 mg/m3 TWA (dust and fume)
OSHA: 0.01 mg/m3 TWA
NIOSH: 0.01 mg/m3 TWA (dust)

Copper (7440-50-8)

ACGIH: 0.2 mg/m3 TWA (fume); 1 mg/m3 TWA (dust and mist, as Cu)
OSHA: 0.1 mg/m3 TWA (dust, fume, mists, as Cu)
NIOSH: 1 mg/m3 TWA (dust and mist)

Engineering Controls

Good ventilation should be sufficient for most conditions. A local exhaust system may be necessary for some operations. Isolation, enclosures, exhausts and ventilation, wetting, and dust collection systems may be used where exposure exceeds limits. Air monitoring for respirable fibrils should be done using the standard asbestos test method, NIOSH 7400(B).

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Use safety glasses when cutting or mechanically working this product, or where airborne dust and fly is present. If dust exposure causes eye discomfort, use chemical goggles.

Personal Protective Equipment: Skin

In order to prevent skin-abrasion or friction-burn, protective clothing should be worn, including heat-resistant gloves.

Personal Protective Equipment: Respiratory

When cutting or mechanically working this material, wear an approved high-efficiency particulate respirator.

Personal Protective Equipment: General

Do not consume food, drink, or tobacco in the areas where they may be contaminated with this material. Avoid skin contact.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance: Base fiber: Color Golden yellow to reddish brown; as finished: whitish/silver/grey color

Odor: None

Physical State: Continuous fibers in a strand or tow

pH: NA

Vapor Pressure: ND

Vapor Density: ND

Boiling Point: NA

Melting Point: NA

Solubility (H2O): Insoluble. Partially soluble in aqueous strong acid.

Specific Gravity: 1.54-1.56 g/cm

Evaporation Rate: NA

VOC: ND

Octanol/H2O Coeff.: NA

Flash Point: >600°C

Flash Point Method: ND

Upper Flammability Limit

(UFL): ND

Lower Flammability Limit (LFL): ND

Burning Rate: ND

Auto Ignition: ND

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*** Section 10 - Chemical Stability & Reactivity Information ***

Chemical Stability

This is a stable material.

Chemical Stability: Conditions to Avoid

Avoid open fire, heated environment at over 600°C

Incompatibility

Incompatible with strong acids. Nickel can react explosively with substances such as nitrates, perchlorates, phosphorous, selenium, sulfur, etc.

Hazardous Decomposition

Hydrogen cyanide during incineration.

Possibility of Hazardous Reactions

Will not occur.

*** Section 11 - Toxicological Information ***

Acute Dose Effects

A: General Product Information

Overexposure to metal dust may cause "metal fume fever" with cold-like symptoms, chills, and a metallic taste in the mouth.

B: Component Analysis - LD50/LC50

Nickel (7440-02-0)

Oral LD50 Rat: >9000 mg/kg

Silver (7440-22-4)

Oral LD50 Rat: >2000 mg/kg

Water (7732-18-5)

Oral LD50 Rat: >90 mL/kg

Carcinogenicity

A: General Product Information

IARC found evidence of cancer in nickel reefing operations with high levels of dust. Other studies of workers exposed to nickel powder and to dust and fumes generated in the production of nickel alloys and of stainless steel have not indicated a respiratory cancer hazard. Mixed results indicate nickel metal is less of a hazard than soluble nickel salts, but should still be handled according to exposure limits.

B: Component Carcinogenicity

Nickel (7440-02-0)

ACGIH: A5 - Not Suspected as a Human Carcinogen

NIOSH: potential occupational carcinogen

NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)

IARC: Monograph 49 [1990], Supplement 7 [1987] (Group 2B (possibly carcinogenic to humans))

*** Section 12 - Ecological Information ***

Ecotoxicity

A: General Product Information

Unlikely to be environmentally mobile.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Nickel (7440-02-0)

Test & Species		Conditions
96 Hr LC50 Oncorhynchus mykiss	31.7 mg/L	adult
96 Hr LC50 Pimephales promelas	3.1 mg/L	
96 Hr LC50 Brachydanio rerio	>100 mg/L	
72 Hr EC50 freshwater algae (4 species)	0.1 mg/L	

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72 Hr EC50 Selenastrum capricornutum	0.18 mg/L
96 Hr EC50 water flea	510 µg/L

Silver (7440-22-4)

Test & Species

Conditions

96 Hr LC50 Pimephales promelas	5.6-7.4 µg/L [flow-through]
96 Hr LC50 Pimephales promelas	9.4-9.7 µg/L [static]
96 Hr LC50 Oncorhynchus mykiss	0.0076 mg/L
96 Hr LC50 Lepomis macrochirus	24.2-48.4 µg/L
48 Hr EC50 Daphnia magna	0.9 µg/L
96 Hr LC50 Daphnia magna	5 µg/L
96 Hr LC50 Hyalella azteca	1.4-2.3 µg/L

Copper (7440-50-8)

Test & Species

Conditions

96 Hr LC50 Pimephales promelas	23 µg/L
96 Hr LC50 Oncorhynchus mykiss	13.8 µg/L
96 Hr LC50 Lepomis macrochirus	236 µg/L
72 Hr EC50 Scenedesmus subspicatus	120 µg/L
96 Hr EC50 water flea	10 µg/L
96 Hr EC50 water flea	200 µg/L

*** Section 13 - Disposal Considerations ***

US EPA Waste Number & Descriptions

Component Waste Numbers

Silver (7440-22-4)

RCRA: 5.0 mg/L regulatory level

Disposal Instructions

All wastes must be handled in accordance with local, state and federal regulations.

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

*** Section 14 - Transportation Information ***

US DOT Information

Shipping Name: Not Regulated

*** Section 15 - Regulatory Information ***

US Federal Regulations

A: Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Nickel (7440-02-0)

SARA 313: 0.1 % de minimis concentration

CERCLA: 100 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers); 45.4 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers)

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Silver (7440-22-4)

SARA 313: 1.0 % de minimis concentration

CERCLA: 1000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the solid metal released is larger than 100 micrometers); 454 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the solid metal released is larger than 100 micrometers)

Copper (7440-50-8)

SARA 313: 1.0 % de minimis concentration

CERCLA: 5000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers); 2270 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers)

B: Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Copper	7440-50-8	DOT regulated severe marine pollutant

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Nickel	7440-02-0	Yes	Yes	Yes	Yes	Yes	Yes
Silver	7440-22-4	Yes	Yes	Yes	Yes	Yes	Yes
Copper	7440-50-8	Yes	Yes	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Nickel	7440-02-0	0.1 %
Silver	7440-22-4	1 %
Copper	7440-50-8	1 %

Additional Regulatory Information

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Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
1,4-Benzenedicarboxylic acid, polymer with 4,6-diamino-1,3-benzenediol dihydrochloride	60857-81-0	Yes	NDSL	ELINCS
Nickel	7440-02-0	Yes	DSL	EINECS
Silver	7440-22-4	Yes	DSL	EINECS
Copper	7440-50-8	Yes	DSL	EINECS
Water	7732-18-5	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

Other Information

The information herein is presented in good faith and believed to be accurate as of the effective date given. However, no warranty, expressed or implied, is given. It is the buyer's responsibility to ensure that its activities comply with Federal, State or provincial, and local laws.

Key/Legend

EPA = Environmental Protection Agency; TSCA = Toxic Substance Control Act; ACGIH = American Conference of Governmental Industrial Hygienists; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration., NJTSR = New Jersey Trade Secret Registry.