

# MATERIAL SAFETY DATA SHEET

## ARSENIC TRISULFIDE GLASS

### Section 1 - Manufacturer Identification

*Manufacturer's Name:* Amorphous Materials, Inc.  
*Address:* 3130 Benton Street, Garland, Texas 75042  
*Emergency telephone:* (972) 494-5624  
*FAX address:* (972) 272-7971  
*E-mail address:* amorphousm@aol.com  
*Web site:* www.AmorphousMaterials.com

### Section 2 - Physical Data

*CAS No.:* 1303-33-9

*Ingredients (Typical values-not specifications):*

Arsenic	60.9%
Sulfur	39.1%

*Product classified as:* Non-hazardous

*DOT warning statement:* None considered necessary

*Solubility:* Insoluble in water and acids. Accelerated testing showed no changes after 7-day exposure to water (Ref. 1). Concentrated hydrochloric acid shows no effect after 12 hours. The glass maybe attacked by alkaline solutions (Ref. 2).

*Melting point:* 300° C

*Boiling point:* 707° C

*Specific gravity:* 3.198

*Solubility in water:* Insoluble

*Appearance:* Ruby red, glassy looking, soft, brittle, somewhat fragile, non-odorous.

*Special Note:* The physical characteristics of naturally occurring arsenic trisulfide (called orpiment, auri pigment, arsenic yellow, king's yellow, king's gold) (Ref. 3) are considerably different from Arsenic Trisulfide Glass, a manufactured product. Mineral arsenic trisulfide is a crystalline material while Arsenic Trisulfide Glass is amorphous. Amorphous forms of materials generally are more inert than crystalline forms.

### Section 3 - Fire and Explosion Hazard Data

*Flash point:* None      *Flammable limits:* Non-flammable.

*LEL:* None; *UEL:* None.

*Extinguishing media:* None required.

*Special fire fighting procedures:* No special techniques required.

Use extinguisher type suitable for surrounding fire.

*Special Note:* Fire, explosion and reactivity hazard information found in the literature for the mineral arsenic trisulfide (orpiment), does not apply to Arsenic Trisulfide Glass, which is a stable product exhibiting no flammable properties. It is not easily oxidized as is naturally occurring arsenic trisulfide. Therefore, no special handling, storage or transportation precautions for fire prevention or extinguishment is required for Arsenic Trisulfide Glass.

*Unusual fire and explosion hazards:* None.

### Section 4 - Reactivity Data

*Stability:* Stable compound.

*Incompatibility (materials to avoid):* None known.

*Conditions to avoid:* None known.

*Hazardous polymerization:* Will not occur.

*Hazardous decomposition or by-products:* None known.

*Special Note:* Reactivity information found in the literature pertaining to the mineral form of arsenic trisulfide does not apply to Arsenic Trisulfide Glass. The arsenic and sulfur in the amorphous glass product is tightly bound and will not combine with the several chemical materials said to have adverse reactions with the naturally occurring form of arsenic trisulfide. Arsenic Trisulfide Glass is a stable, non-deteriorating, homogeneous glass (Ref. 4). Stability and optical characteristics of Arsenic Trisulfide Glass is also discussed in University of Michigan Research Report No. 2389-11-S and 2389-11-S1 (Ref. 5; Ref. 6).

### Section 5 - Health Hazard Data

A Threshold Limit Value (TLV) has not been established for Arsenic Trisulfide Glass. Nor, has the Occupational Safety and Health Administration (OSHA) set a Permissible Exposure Limit (PEL). Recommended human exposure levels for the individual components of Arsenic Trisulfide Glass are as follows:

*Arsenic compounds.* 10 micrograms per cubic meter of air ( $\mu\text{g}/\text{M}^3$ ) determined as a time-weighted average (TWA) exposure for up to eight hours of exposure. (Source: OSHA 29 CFR 1900.1018).

*Sulfur compounds.* No TLV or PEL has been established. Personal exposure should be limited to that of a nuisance dust ( $5 \mu\text{g}/\text{M}^3$  determined as a TWA exposure of up to eight hours (Source: OSHA 29 CFR 1910.1000, Subpart Z, Table Z-1, revised).

*Route(s) of entry:* None.

*Health hazards (acute and chronic):* None.

*Signs and symptoms of exposure:* None known.

*Medical conditions generally aggravated by exposure:* None known.

*Emergency and first aid procedures:*

*Eyes-*Flush with flowing water for 15 minutes after contact with dust, fumes or slurry. Seek medical attention as for any eye injury.

*Skin-*Flush with copious amounts of water after skin contact with dust, fumes or slurry.

*Inhalation-*If ill effects develop, remove exposed person to fresh air. Keep person warm and quiet. Seek medical attention as for any severe respiratory exposure.

*Ingestion-*Should not present a problem. If material is accidentally swallowed, induce vomiting. Seek medical assistance.  
*Possible effects of overexposure:* No adverse health effects should occur from exposure to Arsenic Trisulfide Glass. Under extreme conditions, individual components of Arsenic Trisulfide

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Glass material could possibly (although not likely) cause non-specific symptoms. If heated to temperatures greater than 500 C°, decomposition of the product may allow the sulfur to react slowly with the atmosphere to form SO<sub>2</sub>. This is not a violent reaction. For this reason, prudence suggests that good general ventilation should be used with local exhaust ventilation added as may become necessary.

the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40CFR372:

CAS # 744-38-2  
Chemical name: Arsenic  
Percent by weight: 60.9%

### Section 6 - Precautions For Safe Handling & Use

*Action to take for spills:* Any spill of Arsenic Trisulfide Glass will most likely come from spill of polishing or grinding compound sludge. Abraded particles of Arsenic Trisulfide Glass material will be a minor contaminant in the spill. Contain the spill. Clean up the spill. Transfer spilled material to a separate container for disposal.

*Waste Disposal Method:* Store Arsenic Trisulfide Glass waste in a covered container with other arsenic containing waste materials and make proper disposal as a hazardous waste. Arsenic is regulated as a hazardous waste material under CERCLA/RCRA regulations. Therefore, it must be disposed of in a **permitted** hazardous waste facility in compliance with EPA and/or other applicable local, state and federal regulations applicable at the time of disposal and should be handled in a manner acceptable to good waste management practice (RQ=100 pounds for EP toxicity - arsenic).

*Precautions during handling and storage:* None needed during handling, storage or processing of Arsenic Trisulfide Glass..  
EPA Section 313 notification: Not required.

### Section 7 - Control Measures

*Ventilation:* Local ventilation should be provided that is sufficient to remove any dusts, mists or odors that may evolve during processing. Forced exhaust air of 100 lineal feet per minute (lfm) face velocity should be adequate. Avoid breathing any fumes or dusts that may be generated because of arsenic content of finished product.

*Respiratory protection:* Not required under ordinary circumstances if adequate ventilation is provided. In unventilated areas a high efficiency respirator approved for toxic dusts should be used.

*Personal protective equipment (PPE):* Rubber gloves and plastic aprons should be provided during abrasive polishing operations. Arsenic Sulfide Glass is not absorbed through the skin. PPE is recommended to avoid contact with grinding sludge which may contain other contaminants that could cause adverse skin or health effects.

*Eye protection:* Chemical workers goggles or plastic face shields should be used to provide eye protection from dusts, fumes, mists or flying particles should product break or fragment during processing.

### Section 8 - Section 313 Supplier Notification

This product contains the following **listed** chemical subject to

### Section 9 - References

1. *IR TRANSMITTING OPTICAL GLASS TRG1*, Information No. 61-1968, Jenaer Glaswerk Schott & Gen., West Germany, April 1968.
2. IRG1 Arsenic Trisulfide Glass, *Infrared Transmitting Optical Materials*, Schott Optical Glass, Inc., Duryea, Pennsylvania, 1971.
3. *The Merck Index*, 11<sup>th</sup> Ed., Merck & Co., Inc., Rahway, New Jersey, 1989 (p. 837).
4. Servofrax Arsenic Trisulfide Glass, *Brochure TDS-R-4*, Servo Corporation of America, Hicksville, New York, 1986.
5. Arsenic Trisulfide Glass, *Optical Materials for Infra-red Instrumentation*, Report No. 2389-11 S, Stanley S. Ballard and Kathryn A. McCarthy and William L. Wolfe, Institute of Science & Technology, University of Michigan, Ann Arbor, Michigan, 1959 (p. 32).
6. *Optical Materials for Infra-red Instrumentation*, Supplement 1, Report No. 2389-11-S1, Institute of Science & Technology, University of Michigan, Ann Arbor, Michigan, 1961.
7. *Occupational Safety and Health Standards for General Industry, 29CFR1910.1018(c)*, Occupational Safety and Health Administration, U.S. Department of Labor, Washington, D.C., 1989.
8. *Hazardous Chemicals Desk Reference*, N. Irving Sax and Richard J Lewis, Sr., Van Nostrand Reinhold Company, New York, 1987 (p. 795).
9. *Air Contaminants - Permissible Exposure Limits, Table Z-3, OSHA 3112*, Occupational Safety and Health Administration, U.S. Department of Labor, Washington, D.C., 1989.

*Special Note: This Material Safety Data Sheet is considered to be an essentially similar form to OSHA Form-174 (a non-mandatory form format) and is substituted in lieu thereof. This information is furnished gratuitously, independent of any sale of the product, only for your investigation and independent verification. While the information is believed to be correct, Amorphous Materials, Inc. makes no representation as to the absolute accuracy of the information contained herein. The final word on all OSHA and EPA regulations is that published in the Federal Register.*

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