

**SECTION 1 - IDENTIFICATION**

**COMPANY ADDRESS:**

The Virtual Foundry, Inc  
211 S Water St  
Stoughton, WI 53589  
USA

PRODUCT NAME: **Amaco 46-D Ceramic Clay Filamet™**

PRODUCT USE: Manufacture of metal parts by extrusion, injection-molding, or 3D printing.

**SECTION 2 - HAZARDS IDENTIFICATION SUMMARY**

(As defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200)

**PHYSICAL HAZARDS:** Contact with product at elevated temperatures can result in thermal burns. Inhalation of dusts and vapors of melted material from this product may cause irritation of the eyes, nose, throat and respiratory system. May cause coughing or shortness of breath. Mechanical eye irritant. May cause tearing and redness. Mechanical skin irritant. Prolonged contact may cause skin abrasion, redness, itching. Irritating to the respiratory tract. Large overdoses may cause nervous system disturbances, and diarrhea. May cause nausea and vomiting. No long-term health effects are anticipated.



**HAZARD STATEMENTS:** Irritating to eyes and respiratory tract. Exposure may include persistent cough, shortness of breath.

**WARNING:** CANCER AGENT! INHALATION MAY PRODUCE CANCER. INHALATION MAY CAUSE LUNG DAMAGE. **CONTAINS:** QUARTZ. Use a locally exhausting hood when dealing with particles.

**OTHER HAZARDS:** If small particles are generated during further processing, handling, or by other means, combustible dust concentrations in air may form. Do not breathe vapor or spray.

**SECTION 3 - COMPOSITION, INFORMATION OF INGREDIENTS**

| Material  | CAS No.     | %by Weight  |
|---|-------------|-------------|
| Ball Clay   | 1332-58-7   | 30.0 - 50.0 |
| Fireclay  | 1332-58-7   | 5.0 - 15.0  |
| Chemical Name   | CAS No.     | %by Weight  |
| 2-Propenenitrile, polymer with 1,3-butadiene and ethenylbenzene | 9003-56-9   | trace       |
| Binding Additive  | Proprietary | trace       |

|                 |           |      |
|-----------------|-----------|------|
| Polylactic Acid | 9051-89-2 | <20% |
|-----------------|-----------|------|

#### **SECTION 4 - FIRST AID MEASURES**

**IF SWALLOWED:** Do not induce vomiting. Rinse your mouth thoroughly with water. Give a few small glasses of water or milk to drink. Get medical attention if any discomfort continues.

**IF ON SKIN OR CLOTHING:** Prolonged skin contact may cause redness and irritation. Wash hands and contact skin with soap and water. For molten polymer burns, get medical attention.

**IF IN EYES:** Rinse with water.

**IF INHALED:** Remove from exposure to fresh air. Lay the patient down. Cover with a blanket. If symptoms persist, call a physician. If the person is not breathing, call 911 or an ambulance, then provide medical aid. Prolonged inhalation of dust may cause lung diseases and/or respiratory system irritation.

**MAIN SYMPTOMS:** Redness. Coughing and/or wheezing.

**NOTE TO PHYSICIAN:** Treat symptomatically.

#### **SECTION 5 - FIRE FIGHTING MEASURES**

##### **FLAMMABILITY**

**AUTOIGNITION TEMPERATURE:** 388°C

**FLAMMABILITY LIMITS IN AIR (MEC):** 45g/m<sup>3</sup>

**MEC/MIE:** Refer to NFPA 484, Sec. A4.3.1

**SUITABLE EXTINGUISHING MEDIA:** Foam, carbon dioxide, dry chemical, water.

**UNSUITABLE EXTINGUISHING MEDIA:** Do not use a solid water stream as it may scatter and spread fire.

**SPECIFIC HAZARDS ARISING FROM THE CHEMICAL:** Do not breathe fumes in case of fire.

**HAZARDOUS COMBUSTION PRODUCTS:** No information available.

##### **EXPLOSION DATA**

**SENSITIVITY TO MECHANICAL IMPACT:** Not sensitive.

**SENSITIVITY TO STATIC DISCHARGE:** No information available.

**FIRE FIGHTING INSTRUCTIONS AND FIRE FIGHTING EQUIPMENT:** No information available.

**ADDITIONAL INFORMATION:** No information available.

**PERSONAL PROTECTIVE EQUIPMENT:** Wear self-contained breathing apparatus.

**SECTION 6 - ACCIDENTAL RELEASE MEASURES**

**PERSONAL PRECAUTIONS:** Ensure adequate ventilation. Standard personal protection equipment (PPE). Avoid contact with skin and eyes. Avoid dust formation.

**ENVIRONMENTAL PRECAUTIONS:** Avoid dispersal of spilled material, runoff and contact with soil, waterways, drains, and sewers. Should not be released into the environment, may be dangerous to birds and small animals.

**METHODS FOR CLEANING UP:** Sweep up or vacuum and put into an approved waste container for disposal.

**SECTION 7 - HANDLING AND STORAGE**

**HANDLING:** Do not eat, drink or smoke when using this product. Good personal hygiene procedures should be implemented. Wash hands and any other contaminated areas of the body with soap and water before leaving the work site. Use caution when near molten resin.

**STORAGE:** Store in a dry and cool place.

**SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION**

**EXPOSURE LIMITS**

| Material  | CAS No.   | %by Weight  | ACGIH TLV (Mg/M <sup>3</sup> ) | OSHA PEL (Mg/M <sup>3</sup> ) |
|-----------|-----------|-------------|--------------------------------|-------------------------------|
| Ball Clay | 1332-58-7 | 30.0 - 50.0 | 2.0 (Resp.)                    | 15.0 (Total)<br>5.0 (Resp.)   |
| Fireclay  | 1332-58-7 | 5.0 - 15.0  | 2.0 (Resp.)                    | 15.0 (Total)<br>5.0 (Resp.)   |

| COMPONENT  | OSHA PEL | ACGIH TLV | NIOSH IDLH |
|--|----------|-----------|------------|
| 2-Propenenitrile, polymer with 1,3-butadiene and ethenylbenzene<br>9003-56-9 | -        | -         | -          |

**TLV:** Threshold Limit Value over 8 hours of work.

**PEL:** Permissible Exposure Limit

**ADDITIONAL PROTECTION:** Provide eyewash station and washing facilities accessible to areas of

use and handling.

### ENGINEERING CONTROLS

**Engineering Measures:** Apply technical measures to comply with the occupational exposure limits. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. Provide appropriate local ventilation systems that are suitable for Class II, Group E dusts, per the National Electrical Code, NFPA 70. Provide sufficient mechanical ventilation to reduce airborne concentrations and minimize exposure. Maintain employee exposure below applicable permissible exposure limits.

### EXPOSURE MONITORING

**Exposure Limits:** See table above.

**Hygiene Measures:** Using good personal hygiene practices is always appropriate. Keeping a clean work space, cleaning up properly when done, and not eating, drinking or smoking when using this product.

### PERSONAL PROTECTIVE EQUIPMENT

**Eye protection:** Avoid eye contact. To minimize the risk of injury to eyes, always wear appropriate protective safety glasses, side-shields or chemical safety goggles.

**Skin protection:** Avoid skin contact with molten polymer. Wear appropriate protective clothing to minimize risk of injury to the skin from contact with dust or physical abrasion. Long sleeved/impervious clothing if contact is probable and skin is sensitive. Protect contact with skin when processing; while material is hot, wear insulated safety gloves; wash hands after handling. Coveralls should be made from fire resistive materials which tend to not accumulate static charges. They should be designed in such a way as to avoid accumulation of dust in cuffs, pockets, etc.

**Respiratory protection:** If ventilation is inadequate, suitable respiratory protection must be worn. Consult an industrial hygiene professional prior to respirator selection and use. Use a positive-pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection. **WARNING:** Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Hand protection:** While material is hot, wear insulated safety gloves; wash hands after handling.

**Hygiene measures:** Provide regular cleaning of equipment, work area and clothing. Handle in accordance with good industrial hygiene and safety practices. Do not eat, drink or smoke when using this product. Wash hands before breaks and immediately after handling the product. Avoid contact with eyes. Do not breathe dust. Use personal protective equipment as required.

**Special hazard:** Workers should be protected from the possibility of contact with molten material during fabrication.

**Environmental Protection:** Do not allow to enter drains or watercourses.

## **SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**

|  |   |
|--|---|
| <b>Physical State:</b>                     | Solid   |
| <b>Appearance:</b>                         | Filament, Pellets                                   |
| <b>Color:</b>                              | Brownish  |
| <b>Odor:</b>                               | Slight  |
| <b>Odor Threshold:</b>                     | No information available.                           |
| <b>Melting/Freezing Point:</b>             | 150-180°C (302- 356°F)                              |
| <b>Boiling Point:</b>                      | No information available.                           |
| <b>Flash Point:</b>                        | No information available.                           |
| <b>Evaporation Rate:</b>                   | No information available.                           |
| <b>Flammability:</b>                       | No information available.                           |
| <b>Flammability Limits:</b>                | No information available.                           |
| <b>Vapor Pressure:</b>                     | Not applicable                                      |
| <b>Vapor Density:</b>                      | Not applicable                                      |
| <b>Specific gravity:</b>                   | 2.7 - 3.95 (H2O=1)                                  |
| <b>Relative Density:</b>                   | No information available.                           |
| <b>Water Solubility:</b>                   | Negligible (<0.1%), Insoluble in cold and hot water |
| <b>Percent Volatile (v/v):</b>             | 0%  |
| <b>Chemical Stability:</b>                 | No information available.                           |
| <b>Conditions to avoid:</b>                | No information available.                           |
| <b>Solubility in other solvents:</b>       | Insoluble   |
| <b>Partition Coefficient:</b>              | No information available.                           |
| <b>Auto-Ignition Temperature:</b>          | 388°C   |
| <b>Hazardous Decomposition Products:</b>   | No information available.                           |
| <b>Possibility of Hazardous Reactions:</b> | No information available.                           |
| <b>Hazardous Polymerization:</b>           | No information available.                           |
| <b>Decomposition Temperature:</b>          | 250°C   |
| <b>Viscosity:</b>                          | No information available.                           |
| <b>Explosive Properties:</b>               | No information available.                           |

**Oxidizing Properties:** No information available.

**Other Information:**

|                  |  |
|------------------|--|
| Softening Point: | 80-100°C                                 |
| VOC Content (%)  | negligible                               |
| Bulk Density:    | 0.8-1.3 g/cc (50-80 lb/ft <sup>3</sup> ) |
| MEC:             | 45-120 (g/m <sup>3</sup> )               |
| MIE:             | 4-13 (mJ)                                |
| KST:             | 90-300 (bar-m/sec)                       |
| MIT (layer):     | 650°C                                    |

## **SECTION 10 - STABILITY AND REACTIVITY**

**INCOMPATIBILITY:** Strong oxidizers, reducing agents, and bases.

**CHEMICAL STABILITY:** Stable under recommended storage conditions.

**HAZARDOUS POLYMERIZATION:** Will not undergo hazardous polymerization.

**CONDITIONS & MATERIALS TO AVOID:** Avoid keeping resin molten for excessive periods of time at elevated temperatures. Prolonged exposure will cause polymer degradation. Dust formation. Oxidizing agents/materials, Strong bases. Incompatible with strong oxidizing agents and halogens.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Burning produces noxious and toxic fumes, Carbon monoxide (CO), Carbon Dioxide (CO<sub>2</sub>). Exothermic reaction with water, acids, alkalis, to generate hydrogen and heat.

## **SECTION 11 - TOXICOLOGICAL INFORMATION**

**Principal routes of exposure:** Skin contact.

**PRODUCT INFORMATION:**

**Acute toxicity:** None established.

**Chronic toxicity:** None established.

**Specific effects:** Inhalation of dust may cause shortness of breath, tightness of chest, a sore throat and cough. Ingestion may cause gastrointestinal irritation. Product dust may be irritating to the eyes.

**Long term toxicity:** None established.

**Mutagenic effects:** None established.

**Reproductive toxicity:** None established.

**Carcinogenic effects:** This product contains one or more substances which are classified by IARC as carcinogenic to humans (Group I), probably carcinogenic to humans (Group 2A) or possibly carcinogenic to humans (Group 2B).

| COMPONENT  | ACGIH | IARC    | NTP | OSHA |
|--|-------|---------|-----|------|
| 2-Propenenitrile, polymer with 1,3-butadiene and ethenylbenzene<br>9003-56-9 | -     | Group 3 | -   | --   |

**Target organ effects:** Eyes, Respiratory system.

**Ingestion:** May cause gastrointestinal discomfort if consumed in large amounts. Not an expected route of exposure.

**Inhalation:** Inhalation of dust in high concentration may cause irritation of the respiratory system.

**Eye Contact:** Dust contact with the eyes can lead to mechanical irritation.

**Symptoms related to the physical, chemical, and toxicological characteristics:** Redness. Coughing and/or wheezing.

**Delayed and immediate effects and also chronic effects from short and long term exposure:**

**Irritation:** Product dust may be irritating to eyes, skin, and respiratory system.

## **SECTION 12 - ECOLOGICAL INFORMATION**

**Ecotoxicity:** Pellets may be eaten by wildlife and should be swept up and placed in closed containers. EC50/72h/algae > 1100 mg/L. Do not put materials into waterways or sewers.

**Persistence and degradability:** Not readily biodegradable.

**Bioaccumulation:** Not expected to bioconcentrate or bioaccumulate.

**Mobility:** Is not likely mobile in the environment.

**Other adverse effects:** This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).

**Ozone:** Not applicable.

## **SECTION 13 - DISPOSAL CONSIDERATIONS**

**WASTE DISPOSAL METHODS:** Solid or chemical waste generators must determine whether a discarded waste is classified as a hazardous waste. U.S. EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local waste regulations to ensure complete and accurate classification. Should not be released into the environment. Do not contaminate ponds, waterways or ditches with product or used containers.

**CONTAMINATED PACKAGING:** Empty remaining contents. Do not re-use empty containers. Empty containers should be transported/delivered using a registered waste carrier to local recyclers for disposal.

**SECTION 14 - TRANSPORT INFORMATION**

**DOT:** Not regulated.  
**MEX:** Not regulated.  
**ICAO:** Not regulated.  
**IATA:** Not regulated.  
**IMDG:** Not regulated.  
**UN NUMBER:** N/A.

**SECTION 15 - REGULATORY INFORMATION**

**DOT:** This product is not regulated by USDOT as a Hazardous Material (49 CFR 172.101). No UN code assigned. No placard required for transportation.  
**SARA (TITLE III):** Under applicable definitions, this material may meet the criteria for a delayed (chronic) health hazard.  
**SARA (SECTION 313):** Not Listed.  
**CALIFORNIA PROP. 65:** Listed.  
**TSCA:** Not Listed.  
**DSCL (EEC):** Listed on the DSCL inventory.  
**RCRA HAZARDOUS WASTE NUMBER:** Not Listed.

| COMPONENT              | SARA 313 – Threshold Values % |
|------------------------|-------------------------------|
| 1,3-butadiene 106-99-0 | 0.1                           |

Electrical equipment must be suitable for use in hazardous atmospheres involving Group E combustible dusts in accordance with 29CFR1910.307. Refer to the National Electrical Code (NFPA 70) for guidance in determining the type and design of equipment and installation which meets this requirement.

**CLEAN AIR ACT, TITLE VI (1990):** This product does not contain, nor was it manufactured using ozone depleting chemicals.

**CALIFORNIA PROPOSITION 65:** This product contains the following Proposition 65 chemicals:

| COMPONENT     | CALIFORNIA Prop. 65         |
|---------------|-----------------------------|
| 1,3-butadiene | Carcinogen<br>Developmental |



|           |  |
|-----------|--|
|           | Female Reproductive                                |
| Ball Clay | Carcinogen<br>Developmental<br>Female Reproductive |
| Fireclay  | Carcinogen<br>Developmental<br>Female Reproductive |

**Massachusetts “Right To Know” List**

Minspar 250 - 10.0-30.0%

Fireclay - 10.0-30.0%

**Rhode Island “Right To Know” List**

Ball Clay - 60.0-100.0%

Fireclay - 10.0-30.0%

**Minnesota “Right To Know” List**

Ball Clay - 60.0-100.0%

Fireclay - 10.0-30.0%

**New Jersey “Right To Know” List**

Ball Clay - 60.0-100.0%

Fireclay - 10.0-30.0%

**Pennsylvania “Right To Know” List**

Ball Clay - 60.0-100.0%

Fireclay - 10.0-30.0%

**Inventory Status:**

TSCA (USA): Listed\*

DSL (Canada): Listed\*

NDSL (Canada): Not Listed

EINECS (Europe): Listed\*

AICS (Australia): Listed\*

ENCS (Japan): Not Identified\*\*

IECSC (People’s Republic of China): Listed\*

PICCS (Philippines): Listed\*

ECL (Korea): Listed\*

ECN (Taiwan): Listed\*

\*\*Listed” indicates that all components of this product comply with the inventory requirements administered by the governing country(s).

\*\* Pure metals are not specifically identified by CAS or ENCS number.

**SECTION 16 - OTHER INFORMATION, INCLUDING THE DATE OF PREPARATION OF THE LAST REVISION**

**LABEL REQUIREMENTS:** Not expected to produce significant adverse health effects when the

recommended instructions for use are followed.

|                           |  |   |
|---------------------------|--|---|
| NFPA<br>HAZARD<br>RATINGS | HEALTH   | 0 |
|                           | FLAMMABILITY   | 1 |
|                           | PHYSICAL HAZARD  | 0 |
|                           | INSTABILITY  | - |
|                           | 4=Severe   3=Serious   2=Moderate   1=Slight   0=Minimal |   |

|                           |  |   |
|---------------------------|--|---|
| HMIS<br>HAZARD<br>RATINGS | HEALTH   | 0 |
|                           | FLAMMABILITY   | 1 |
|                           | PHYSICAL HAZARD  | 0 |
|                           | PERSONAL PROTECTION                                      | X |
|                           | 4=Severe   3=Serious   2=Moderate   1=Slight   0=Minimal |   |

- Causes skin irritation.
- Causes serious eye irritation.
- Harmful if inhaled.
- May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- May cause cancer.
- May cause damage to organs (lungs) through prolonged or repeated exposure.

**DISCLAIMER:** The information provided in this SDS is based on available data from reliable sources and is correct to the best of The Virtual Foundry, Inc's knowledge. The Virtual Foundry, Inc makes no warranty, express or implied, regarding the accuracy of the data or the results obtained from the use of this product. Nothing herein may be construed as recommending any practice or any product in violation of any law or regulations. The user is solely responsible for determining the suitability of any material or product for a specific purpose and for adopting any appropriate safety precautions. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

**REVISED DATE:** December 2021