

## **SECTION 1 - IDENTIFICATION**

### **COMPANY ADDRESS:**

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

PRODUCT NAME: **Tungsten Filamet™**

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

## **SECTION 2 - HAZARDS IDENTIFICATION SUMMARY**

(As defined by 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. The dust causes slight to mild irritation of the eyes. The dust causes slight to mild irritation of the skin. Irritating to the respiratory tract. Large overdoses may cause nervous system disturbances, and diarrhea.

### **HAZARD STATEMENTS:**

H313	May be harmful in contact with skin
H320	Causes eye irritation
H333	May be harmful if inhaled
H335	May cause respiratory irritation

### **GHS PRECAUTIONARY STATEMENTS:**

P261	Avoid breathing dust.
P264	Wash skin thoroughly after handling.
P280	Wear protective gloves/eye protection/face protection
P303+P352	IF ON SKIN: Wash with plenty of soap and water.
P304+P340+P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a poison center / doctor if you feel unwell.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P332+P313	If skin irritation occurs: Get medical advice/attention.
P337+P313	If eye irritation persists: Get medical advice/attention.
P363	Wash contaminated clothing before reuse.
P370+P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction

**OTHER HAZARDS:** If small particles are generated during further processing, handling, or by other means, combustible dust concentrations in air may form.

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

COMPONENT	PERCENTAGE	CAS NUMBER
Tungsten	95%+	7440-33-7
2-Propenenitrile, polymer with 1,3-butadiene and ethenylbenzene	trace	9003-56-9
Binding Additive	trace	Proprietary
Polylactic Acid	balance	9051-89-2

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

**IF SWALLOWED:** Call a poison control center or doctor immediately for treatment advice. Do not induce vomiting unless told to do so by the poison control center or consult a doctor if necessary.

**IF ON SKIN OR CLOTHING:** Immediately flush with plenty of water for at least 15 minutes. Remove contaminated clothing. Wash skin using soap. Get medical attention if symptoms persist. Cool skin rapidly with cold water after contact with hot polymer. DO NOT attempt to remove hot polymer from skin or contaminated clothing as skin may be easily damaged. If skin irritation persists, call a physician.

**IF IN EYES:** Flush eyes with large volumes of water for at least 15 minutes lifting upper and lower eyelids occasionally. Seek medical attention if irritation develops.

**IF INHALED:** Remove to fresh air. Lay patient down. Cover with blanket. If symptoms persist, call a physician. If person is not breathing, call 911 or an ambulance, then provide medical aid.

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

**NOTE TO PHYSICIAN:** Treat symptomatically.

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

##### **FLAMMABILITY**

**AUTOIGNITION TEMPERATURE:** 388°C

**SUITABLE EXTINGUISHING MEDIA:** Cover burning material with an inert powder, such as dry sand or limestone, to exclude oxygen. Fine dust generated during grinding operations may ignite if allowed to accumulate and subjected to an ignition source. Use foam, Carbon Dioxide (CO<sub>2</sub>), dry chemical, alcohol resistant foams (preferred if available). General-purpose synthetic foams (including AFFF) or protein foams may function, but much less effectively.

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

**SPECIFIC HAZARDS ARISING FROM THE CHEMICAL:** Thermal decomposition can lead to release of irritating gases and vapors. Do not breathe fumes in case of fire.

**HAZARDOUS COMBUSTION PRODUCTS:** Carbon oxides Nitrogen oxides (NO<sub>x</sub>) Hydrocarbons.

## EXPLOSION DATA:

**SENSITIVITY TO MECHANICAL IMPACT:** Not sensitive

**SENSITIVITY TO STATIC DISCHARGE:** Fine dust dispersed in air, in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

**FIRE FIGHTING INSTRUCTIONS AND FIRE FIGHTING EQUIPMENT:** As in any fire, wear self-contained breathing apparatus pressure-demand, (MSHA/NIOSH approved or equivalent) and in full protective gear. Cool containers / tanks with water spray. Water mist may be used to cool closed containers.

**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 eyes. Avoid dust formation.

**ENVIRONMENTAL PRECAUTIONS:** Should not be released into the environment, may be dangerous to birds and small animals.

**METHODS FOR CLEANING UP:** Vacuum or carefully scoop up spilled material and place in appropriate container for disposal. Avoid creating dusty conditions and prevent wind dispersal. Ventilate area through non-mechanical means (e.g. opening a window). Take care not to raise dust. Use non-sparking tools. Clean up using methods, which avoid dust, generation such as vacuuming (with appropriate filter to prevent airborne dust levels which exceed the TLV), wet dust mop or wet clean up. If airborne dust is generated, use an appropriate NIOSH-approved respirator.

## SECTION 7 - HANDLING AND STORAGE

**HANDLING:** Use personal protective equipment. Workers should be protected from the possibility of contact with molten material during fabrication. Avoid contact with eyes. Low hazard for usual industrial or commercial handling. Avoid dust formation.

**STORAGE:** Keep tightly closed in cool, dry and well-ventilated environment. Keep away from heat, sparks, and flames. Keep away from incompatible materials. Store at temperatures not exceeding 50°C.

## SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION

### EXPOSURE LIMITS

COMPONENT	OSHA PEL	ACIGH TLV	NIOSH IDLH
2-Propenenitrile, polymer with 1,3-butadiene and ethenylbenzene 9003-56-9	-	-	-

COMPONENT	CAS #	TYPICAL	EXPOSURE	BASIS	ENTITY
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		WEIGHT (%)	LIMITS		
Tungsten	7440-33-7	100	5 mg/m <sup>3</sup>	TLV	ACGIH
			10 mg/m <sup>3</sup>	STEL	ACGIH
			5 mg/m <sup>3</sup>	PEL	OSHA
			5 mg/m <sup>3</sup>	REL	NIOSH
			10 mg/m <sup>3</sup>	STEL	NIOSH

**STEL:** Short Term Exposure Limit during x minutes.

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

**REL:** Recommended Exposure Limit

**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 exhaust ventilation at places where dust is formed.

### Exposure Monitoring:

**Exposure Limits:** This material can generate Particulates Not Otherwise Classifiable (PNOC). The Occupational Safety and Health Administration (OSHA) PEL/TWA for PNOC is 15mg/m<sup>3</sup> for the respirable fraction. The American Conference of Governmental Industrial Hygienists (ACGIH) TLV/TWA for PNOC is 10 mg/m<sup>3</sup> for inhalable particulates and 3 mg/m<sup>3</sup> for respirable particulates.

**Hygiene Measures:** Avoid contact with eyes.

## PERSONAL PROTECTIVE EQUIPMENT

**Eye protection:** Safety glasses with side-shields. Goggles.

**Skin protection:** 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.

**Respiratory protection:** Respirator must be worn if exposed to dust. Wear respirator with dust filter. Respiratory protection is needed if any of the exposure limits in Section 3 are exceeded. 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:** Wear if contact is probable and skin is sensitive.

**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 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>	Dark Grey
<b>Odor:</b>	Slight
<b>Odor Threshold:</b>	No information available.
<b>Melting/Freezing Point:</b>	388°C
<b>Flash Point:</b>	349°C
<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>Relative Density:</b>	10.2g/cc
<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>Viscosity:</b>	No information available.
<b>Explosive Properties:</b>	Fine dust dispersed in air may ignite.
<b>Oxidizing Properties:</b>	No information available.
<b>Other Information:</b>	
Softening Point:	80-100°C
Molecular weight:	No information available.
VOC Content (%)	negligible

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

**PRODUCT REACTIVITY:** None expected under conditions of normal use.

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

**HAZARDOUS POLYMERIZATION:** Will Not Occur

**CONDITIONS & MATERIALS TO AVOID:** Sparks. 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<sup>2</sup>).

**POSSIBILITY OF HAZARDOUS REACTIONS:** No information available.

**DECOMPOSITION PRODUCTS:** Tungsten Oxide

## **SECTION 11 - TOXICOLOGICAL INFORMATION**

**Principal routes of exposure:** Eye contact, Skin contact, Inhalation, Ingestion.

### **PRODUCT INFORMATION**

**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 eyes.

**Long term toxicity:** No information available.

**Mutagenic effects:** No information available.

**Reproductive toxicity:** No data is available on the product itself.

**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 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 respiratory system.

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

**Symptoms related to the physical, chemical, and toxicological characteristics:**

**Symptoms:** 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.

To the best of our knowledge, the toxicological effects of tungsten have not been extensively studied.

## **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

**Persistence and degradability:** Not readily biodegradable. Will convert to tungsten oxide during prolonged contact with water.

**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 treatment

**WASTE DISPOSAL METHODS:** Dispose of in accordance with procedures applying to the disposal of the product, in accordance with local and national regulations. Should not be released into the environment. Do not contaminate ponds, waterways or ditches with chemical or used container.

**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.

**PROPER SHIPPING NAME:**

### **SECTION 15 - REGULATORY INFORMATION**

**DOT:** Not regulated

**SARA (TITLE III):** Under applicable definitions, this material may meet the criteria for a delayed (chronic) health hazard. SARA (SECTION 313): Tungsten is not subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR Part 372.

**CALIFORNIA PROP. 65:** Not Listed

**TSCA:** Listed in the TSCA inventory

**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

**SARA 311/312 HAZARD CATEGORIES:**

<b>Acute Health Hazard:</b>	No
<b>Chronic Health Hazard:</b>	No
<b>Fire Hazard:</b>	No
<b>Sudden Release of Pressure Hazard:</b>	No
<b>Reactive Hazard:</b>	No

**U.S STATE REGULATIONS:**

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

COMPONENT	CALIFORNIA Prop. 65
1,3-butadiene	Carcinogen Developmental Female Reproductive

**SECTION 16 - OTHER INFORMATION, INCLUDING 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 HAZARD RATINGS	HEALTH	0
	FLAMMABILITY	1
	PHYSICAL HAZARD	0
	INSTABILITY	-
	4=Severe 3=Serious 2=Moderate 1=Slight 0=Minimal	

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

**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, LLC's knowledge. The Virtual Foundry, LLC makes no warranty, express or



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**REVISED DATE:** August 2018  
**REFERENCE:** Revised for GHS compliance