

# Dynamix<sup>™</sup>

## SAFETY DATA SHEET

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### 1. IDENTIFICATION

Product Name	Dynamix Superalloy Abrasive
Recommended Use	Abrasive applications (i.e. abrasive blasting, coating removal, corrosion removal, etc.)
Manufacturer Address	10X Engineered Materials, LLC 1162 Manchester Ave. Wabash, IN 46992 United States
Company Phone Number	(260) 209-1207
Emergency Telephone	(260) 209-0154 (after 5 p.m. EST and weekends)

### 2. HAZARDS IDENTIFICATION

OSHA Regulatory Status	This material is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)
Label elements	The product contains no substances which, at their given concentration, are considered to be hazardous to health.
Hazards not otherwise classified (HNOC)	May cause temporary skin and mucous membranes itching due to mechanical abrasion effect of material.
Unknown acute toxicity	No information available

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	Chemical Formula	CAS Number	Weight %
Silicon Dioxide (amorphous)	SiO <sub>2</sub>	7631-86-9	35-45
Silicon Dioxide (crystalline)	SiO <sub>2</sub>	14808-60-7	<0.1
Calcium Oxide	CaO	1305-78-8	25-35
Magnesium Oxide	MgO	1309-48-4	5-15
Aluminum Oxide	Al <sub>2</sub> O <sub>3</sub>	1344-28-1	5-15
Iron Oxide	FeO	1345-25-1	0-3
Titanium Dioxide	TiO <sub>2</sub>	13463-67-7	0-0.5
Beryllium	Be	7440-41-7	0.00058

Additional Information – Beryllium measurements from multiple laboratories using multiple testing methods vary widely and average 0.00058%. Results range from non-detectable (less than 0.0001%) to 0.0012%. This product is a by-product of mineral wool insulation and has the same material composition. In a review of human epidemiological and animal toxicological studies by the World Health Organization International Agency for Research on Cancer (IARC), this material composition was categorized in Group 3 (not classifiable as to carcinogenicity in humans). The incidence of lung lesions and tumors, which are characteristic of beryllium disease, was determined not to be different from control groups in multiple studies of long-term exposure to both low and high concentrations of inhalable particles and fibers. See Section 11. Toxicology for more information.

### 4. FIRST AID MEASURES

Description of First Aid Measures	
Eye contact	- Rinse thoroughly with plenty of water as well as under the eyelids. - DO NOT rub or scratch eyes. - If eye irritation persists, get medical attention.
Skin contact	- Wash off immediately with soap and cold water. - Use a washcloth to help remove dust from skin. - Never use compressed air to remove materials from skin or clothing.
Inhalation	- Remove to fresh air. - If symptoms persist, call a physician.
Ingestion	- Accidental ingestion of this material is unlikely. - Rinse mouth with water and drink water to remove dust from the throat.
Note to physicians	- Treat symptomatically.

### 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	None
Specific hazards arising from the product	No information available
Explosion data - Sensitivity to Mechanical Impact	None

- Sensitivity to Static Discharge	None			
Protective equipment and precautions for firefighters	No special equipment is necessary for this material.			
<b>6. ACCIDENTAL RELEASE MEASURES</b>				
Personal precautions, protective equipment, and emergency procedures				
Personal precautions	<ul style="list-style-type: none"> <li>- Avoid contact with eyes and skin.</li> <li>- Use personal protective equipment as required.</li> <li>- Wash thoroughly after handling.</li> </ul>			
Environmental precautions	<ul style="list-style-type: none"> <li>- See Section 12 for additional ecological information.</li> <li>- Dispose of contents/container to an approved waste disposal facility.</li> </ul>			
Methods and material for containment and cleaning up				
Methods for containment	<ul style="list-style-type: none"> <li>- Prevent further leakage or spillage if safe to do so.</li> </ul>			
Methods for cleaning up	<ul style="list-style-type: none"> <li>- Use personal protective equipment as required.</li> <li>- Pick up and transfer to properly labeled containers.</li> <li>- Avoid creating dust.</li> <li>- Keep workspace surfaces clean.</li> <li>- Dispose of in accordance with Local, State, Federal and Provincial regulations.</li> </ul>			
<b>7. HANDLING AND STORAGE</b>				
Conditions for safe storage, including any incompatibilities				
Storage conditions	Keep in a dry place			
Known incompatible materials	Mild reaction and odor when contacted with strong acids. Should the material be contaminated with acid, provide adequate ventilation and respiratory protection to clean the area. Do not use contaminated product and dispose in accordance with governing laws and standards for safe handling, spill remediation, and disposal of acids.			
<b>8. EXPOSURE CONTROLS/PERSONAL PROTECTION</b>				
Control Parameters				
Exposure Guidelines	Ingredient	OSHA PEL (8-hour TWA)	NIOSH REL (up to 10-hour TWA)	ACGIH TLV (8-hour TWA)
	Total and Respirable Dust	15 mg/m <sup>3</sup> (total dust) 5 mg/m <sup>3</sup> (respirable)		
	Amorphous Silicon Dioxide	20 mppcf or (80 mg/m <sup>3</sup> )/(%SiO <sub>2</sub> )	6 mg/m <sup>3</sup>	6 mg/m <sup>3</sup> (total dust) 3 mg/m <sup>3</sup> (respirable)
	Crystalline Silicon Dioxide	0.05 mg/m <sup>3</sup> (respirable)	0.05 mg/m <sup>3</sup> (respirable)	0.025 mg/m <sup>3</sup> (respirable)
	Calcium Oxide	5 mg/m <sup>3</sup>	2 mg/m <sup>3</sup>	2 mg/m <sup>3</sup>
	Magnesium Oxide	15 mg/m <sup>3</sup> (total dust)		10 mg/m <sup>3</sup> (inhalable)
	Aluminum Oxide	15 mg/m <sup>3</sup> (total dust) 5 mg/m <sup>3</sup> (respirable)		1 mg/m <sup>3</sup> (respirable)
	Iron Oxide	10 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>	5 mg/m <sup>3</sup> (respirable)
	Titanium Dioxide	15 mg/m <sup>3</sup> (total dust)		2.5 mg/m <sup>3</sup> (total dust) (respirable)
	Beryllium	0.2 µg/m <sup>3</sup>		0.05 µg/m <sup>3</sup> (inhalable)
Engineering Controls	<ul style="list-style-type: none"> <li>- Provide local exhaust and/or general ventilation to control dust.</li> <li>- Dust collection system should be used to reduce exposure to dust.</li> <li>- Vacuum or wet clean-up methods should be used.</li> <li>- Using this material in an uncontrolled environment (outside a blast booth or similar enclosure) may create particulate dust. Appropriate controls are recommended.</li> </ul>			
Individual protection measures, such as personal protective equipment				
Eye/face protection	<ul style="list-style-type: none"> <li>- Wear safety glasses with side shields (or goggles).</li> <li>- Wear an abrasive-blasting respirator that covers the head, neck, and shoulders during blasting.</li> </ul>			
Skin and body protection	<ul style="list-style-type: none"> <li>- Wear protective gloves when handling the product</li> <li>- Wear long-sleeved shirt and long pants.</li> <li>- Use gloves with full forearm protection with an apron or coveralls when blasting.</li> </ul>			
Respiratory protection	<ul style="list-style-type: none"> <li>- A properly fitted NIOSH approved respirator is recommended when using the material.</li> </ul>			

	- Use a Type CE NIOSH-certified blasting airline respirator with positive pressure helmet during blasting.
General hygiene consideration	- Wash hands before breaks and immediately after handling products. - Wash clothing after using the product.
<b>9. PHYSICAL AND CHEMICAL PROPERTIES</b>	
Appearance/Physical state	Solid particulate
Odor/Odor threshold	Not relevant
pH	Not relevant
Color	Black, gray
Melting point	1150°C / 2102°F
Boiling point	Not relevant
Flash point	Not relevant
Evaporation rate	Not relevant
Flammability	Non-flammable
Upper/lower explosive limits	Not relevant
Vapor pressure	Not relevant
Vapor density	Not relevant
Material density	2.7-2.9 g/cc
Water solubility	Insoluble in water
Partition coefficient	Not relevant
Auto-ignition temperature	Not relevant
Decomposition temperature	Not available
Viscosity	Not relevant
<b>10. STABILITY AND REACTIVITY</b>	
Reactivity/incompatible materials	Mild reaction with strong acids
Chemical stability	Stable
Possibility of hazardous reactions	None under normal processing
Hazardous decomposition products	None
<b>11. TOXICOLOGICAL INFORMATION</b>	
<p>Information on likely routes of exposure</p> <p>Dust may cause temporary skin and mucous membrane irritation due to mechanical abrasion. Mechanical abrasion is not considered as a health hazard as defined by the Hazard Communication Standard (HCS 2012) OSHA Regulation. Inhalation may cause coughing, nose and throat irritation and sneezing. High exposures may cause difficult breathing, congestion, and chest tightness.</p>	
<p>International Agency for Research on Cancer (IARC) Information</p> <p>This product is a by-product from the manufacture of mineral wool insulation and has the same material composition as slag wool, a subclass of mineral wool whose primary ingredient is blast furnace slag from steelmaking. The World Health Organization International Agency for Research on Cancer (IARC) convened a working group of scientists from around the world in 2001 to review human epidemiological and animal toxicological studies of exposure to respirable mineral wool dust and fibers over several decades. The report of the working group was published in 2002 under the title "IARC Monograph on the Carcinogenic Risks to Humans, Volume 81, Man-Made Vitreous Fibres." The working group concluded that "insulation glass wool, continuous glass filament, rock (stone) wool and slag wool are not classifiable as to their carcinogenicity to humans (Group 3)."</p> <p>Primarily because of their material composition (mineral oxide ingredients), particularly the slag wool subclass of mineral wool to which this product's material composition is identical, these materials are biosoluble (not biopersistent) in the lung and are able to be cleared more completely and efficiently than less soluble and more persistent fibers and particles like asbestos, crystalline silica, and beryllium. In comparisons of lung cancer deaths among groups of workers exposed to inhalable and respirable fractions of airborne mineral wool over varying lengths of employment to control groups, Standard Mortality Ratios (SMR) were not statistically different from 1.0 (deaths from lung cancer, health outcomes, and overall mortality in exposed groups and control groups were determined not to be different with statistical significance). Animal studies of long-term inhalation exposure to high doses of respirable material showed that lung cell damage, lung fibrosis, lung tumors, lung cancer, and life span were also either not observed or determined not to be different with statistical significance from control groups of animals not exposed to the material. The animal studies were focused on respirable fibers from insulation, which because of the length of respirable fibers have been demonstrated to be more toxic than short fibers in animals (Castranova et al, "Critical roles of fiber length in the bioactivity and cytotoxicity of glass fibers", Society of Toxicology Annual Meeting, March 20-23, 2000).</p> <p>Inhaled fibers and dust particles are filtered in the bronchial airways of the lung through which only the respirable fraction (aerodynamic diameter &lt;10 µm in humans, &lt;3 µm in rats) can pass and reach the alveolar-interstitial (AI) region of the lung, where alveoli exchange oxygen with the bloodstream. Long respirable fibers with a diameter of less than 1 µm (rats) or 3 µm (humans) and a length-to-diameter ratio of &gt;5 can reach the AI region of the lungs despite their length. Inhaled fibers and particles that are filtered in the airways are cleared by the mucociliary escalator to the throat, where they are primarily swallowed and excreted through the digestive system. Respirable particles that reach the AI region are engulfed by macrophage cells (pH 4.5) and cleared by the mucociliary escalator to the throat or through the lymph system. Some respirable material dissolves in extracellular fluid of the lung at a near-neutral pH of 7.4. Chronic effects and toxicity, including but not limited</p>	

to persistent inflammation, cell damage, lesions, fibrosis, and tumors can develop in the lungs when respirable fibers and dust particles are unable to be cleared by macrophages or dissolved in extracellular lung fluid. Poorly soluble materials have long retention times in the lung and cause localized pulmonary toxicity initiated by a persistent pro-inflammatory response to particle deposition (Bevan et al, "Toxicity testing of poorly soluble particles, lung overload and lung cancer", Regulatory Toxicology and Pharmacology, Vol 100, pp 80-91, 2018). These more durable particles are known to cause chronic lung diseases and cancer and have been observed in human lungs in autopsies conducted years or decades after exposure.

As an illustration, a study of long-term inhalation exposure to low, medium, and high doses of respirable mineral wool fibers, including slag wool, involved exposing groups of 140 rats to 3, 16, and 30 mg/m<sup>3</sup> of respirable fibers 5 hours/day, 6 days/week, for 2 years and observing them for 28 months (McConnell et al, "Chronic Inhalation Study of Size-Separated Rock and Slag Wool Insulation Fibers in Fischer 344/N Rats", Inhalation Toxicology, 6:6, pp 571-614, 1994). Fibers were size selected to be respirable in rats (diameter = 0.85 μm, length = 13 μm). A similar group of rats was exposed only to filtered air as a negative control. Another group of rats was exposed to 10 mg/m<sup>3</sup> of respirable crocidolite asbestos fibers as a positive control because asbestos is known to cause lung damage, fibrosis, and cancer in humans and animals. The key findings of this study were as follows:

- Exposure in the asbestos group was stopped at 10 months due to labored breathing and increased mortality among exposed rats. Lung weights from fiber accumulation increased through month 18 at which point lung weights were 43% heavier than unexposed controls. Lung burden decreased only partially between cessation of exposure and the end of the study. Lung tumors were observed in 14 of 106 rats analyzed in the asbestos group.
- There was no increase in lung weights from exposure to slag wool at any point during the study compared with negative controls exposed only to filtered air indicating that the lung burden of slag wool was being cleared at a rate similar to that of material deposition during exposure times.
- Particle counts in the lungs of all rats exposed to slag wool decreased rapidly after exposure was stopped at 24 months indicating that the material is rapidly dissolved and is not persistent in the lung.
- Median life span of rats exposed to slag wool was the same as unexposed rats.
- The authors noted that "No treatment-related macroscopic lesions were observed in the lungs or pleura of rats exposed to slag wool at any point during the study."

The human and animal studies of exposure to mineral wools reviewed by the IARC working group and detailed in the 2002 IARC Monograph provide direct assessments of the toxicity and health risks from exposure to the material composition of this product. In these toxicological studies of long-term exposure to low, medium, and high airborne particle and fiber concentrations, the chronic effects of trace hazardous metals that may be present in the product, including localized lesions, fibrosis, and tumors associated with beryllium disease, were either not observed at all or determined not to be different with statistical significance from control groups in both humans and animals.

#### 12. ECOLOGICAL INFORMATION

This product is not hazardous to the environment. Fish populations exposed to the product at levels of 10 mg/L and 100 mg/L resulted in a 0% mortality rate in tests conducted in accordance with Washington State Department of Ecology Publication 80-12.

#### 13. DISPOSAL CONSIDERATIONS

Disposal should be in accordance with applicable regional, national, and local laws and regulations.

#### 14. TRANSPORT INFORMATION

This product is not subject to regulation as a hazardous material for shipping.

#### 15. REGULATORY INFORMATION

##### US Federal Regulations

SARA 313	Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.
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SARA 311/312 Hazard Categories	<ul style="list-style-type: none"> <li>- Acute health hazard</li> <li>- Chronic health hazard</li> <li>- Fire hazard</li> <li>- Sudden release of pressure hazard</li> <li>- Reactive hazard</li> </ul>	<ul style="list-style-type: none"> <li>- No</li> <li>- No</li> <li>- No</li> <li>- No</li> <li>- No</li> </ul>
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CWA (Clean Water Act)	This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (CWA) (40 CFR 122.21 and 40 CFR 122.42).
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CERCLA (Comprehensive Environmental Response Compensation and Liability Act)	This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.
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##### US State Regulations

California Proposition 65	This product does not contain any Proposition 65 chemicals. Certification in process.
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##### International Regulations

<b>REACH</b>	This product is exempt from the obligation to register under REACH legislation (EC 1907/2006) Annex V 7. This product is an inorganic substance and does not meet the criteria for PBT or vPvB in accordance with Annex XIII of REACH.
<b>Other</b>	No known additional regulations for this product.
<b>16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION</b>	
<b>Creation Date</b>	<b>06-Feb-2024</b>
<b>Revision Date</b>	<b>06-Feb-2024</b>
<b>Disclaimer</b>	Reasonable care has been taken in the preparation of this information, but the manufacturer makes no warranty of merchantability or any other warranty, express or implied, with respect to this information. The manufacturer makes no representations and assumes no liability for any direct, incidental, or consequential damages resulting from its use.
<b>End of Safety Data Sheet</b>	