

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878 Issue date: 9/10/2018 Revision date: 29/8/2023 Version: 2.1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Mixture

Trade name : EOS Titanium Ti64 Grade 5/ Ti64 Grade 23

Product code : 9011-0045; 9011-0046
Type of product : Metal powder

JFI : Y9N9-JP2U-FC85-DHH0

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses

Industrial/Professional use spec : Industrial

Use of the substance/mixture : Ti6Al4V pre-alloyed powder for DMLS processes in EOS M systems

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Supplier

Electro Optical Systems Finland Oy Lemminkäisenkatu 36

20520 Turku FINLAND

T +358 (0) 20 765 9144/9147 - F +358 (0) 20 765 9141

MSDSInfo@eos.info - https://www.eos.info/

1.4. Emergency telephone number

Emergency number : +49 (0) 89 / 893 36 - 0 (8 am - 5 pm);

+49 (0) 89 / 893 36 - 151 (Mon-Thurs 9 am - 12 pm & 1 pm - 6 pm; Fri 1 pm - 4 pm (CET))

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Flammable solids, Category 1 H228

Full text of H- and EUH-statements: see section 16

Adverse physicochemical, human health and environmental effects

No additional information available

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



GHS02

Signal word (CLP) : Danger

Hazard statements (CLP) : H228 - Flammable solid.

Precautionary statements (CLP) : P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.

No smoking.

P280 - Wear protective gloves.

P240 - Ground and bond container and receiving equipment.
P241 - Use explosion-proof Complete protective clothing equipment.

 ${\sf P370+P378-In\ case\ of\ fire:\ Use\ Dry\ extinguishing\ powder,\ sand\ to\ extinguish.}$

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2.3. Other hazards

Contains no PBT/vPvB substances ≥ 0.1% assessed in accordance with REACH Annex XIII

The mixture does not contain substance(s) included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at a concentration equal to or greater than 0,1 %

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Titanium	CAS-No.: 7440-32-6 EC-No.: 231-142-3 REACH-no: 01-2119484878-14	89 – 91	Not classified
Aluminum	CAS-No.: 7429-90-5 EC-No.: 231-072-3 EC Index-No.: 013-002-00-1 REACH-no: 01-2119529243-45	5.5 – 6.75	Flam. Sol. 1, H228 Water-react. 2, H261

Full text of H- and EUH-statements: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person.

First-aid measures after inhalation : Allow affected person to breathe fresh air. Allow the victim to rest.

First-aid measures after skin contact : Remove affected clothing and wash all exposed skin area with mild soap and water,

followed by warm water rinse. Brush off loose particles from skin.

First-aid measures after eye contact : Rinse immediately with plenty of water. Obtain medical attention if pain, blinking or redness

persists.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects : Not expected to present a significant hazard under anticipated conditions of normal use.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Dry powder. Sand.

Unsuitable extinguishing media : Water. Foam. Carbon dioxide (CO2).

5.2. Special hazards arising from the substance or mixture

Fire hazard : Explosive dust-air mixtures may form.

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5.3. Advice for firefighters

Firefighting instructions : Exercise caution when fighting any chemical fire. Prevent fire fighting water from entering

the environment.

Protective equipment for firefighters : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Do not allow contact with air. Avoid creating or spreading dust. Refer to protective measures

listed in Sections 7 and 8.

6.1.1. For non-emergency personnel

Protective equipment : Refer to chapter 8.

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.

Emergency procedures : Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters. Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : On land, sweep or shovel into suitable containers. Minimise generation of dust. Store away

from other materials. Take up mechanically (sweeping, shovelling) and collect in suitable

container for disposal.

6.4. Reference to other sections

See Section 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Handle empty containers with care because residual vapours are flammable. Catches fire

spontaneously if exposed to air. Do not allow contact with water. Avoid creating or

spreading dust.

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or

smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapour. No open flames. No smoking. Do not allow contact with air.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Do not handle or store near heat, sparks, or any other potential ignition sources.

Storage conditions : Keep container closed when not in use. Store in a dry place. Protect from moisture.

Incompatible products : Strong bases. Strong acids.

Incompatible materials : Sources of ignition. Direct sunlight. Heat sources. Do not allow contact with water.

Special rules on packaging : Store in a closed container.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 National occupational exposure and biological limit values

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EOS Titanium Ti64 Grade 5/ Ti64 Grade 23		
United Kingdom - Occupational Exposure Limits		
Local name	Aluminium	
WEL TWA (OEL TWA) [1]	2 mg/m³ alkyl compounds 2 mg/m³ salts, soluble 10 mg/m³ metal, inhalable dust 4 mg/m³ metal, respirable dust	
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE	
Aluminum (7429-90-5)		
United Kingdom - Occupational Exposure Limits		
Local name	Aluminium	
WEL TWA (OEL TWA) [1]	10 mg/m³ (inhalable dust) 4 mg/m³ (respirable dust)	
WEL STEL (OEL STEL)	12 mg/m³ (calculated value)	
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE	

8.1.2. Recommended monitoring procedures

No additional information available

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

DNEL/DMEL (Workers) aliminium powder (stabilised)		
Long-term - local effects, systemic	3,72 mg/ m³	
Long-term - systemic effects, local	3,72 mg/ m³	
DNEL/DMEL (Consumer) aliminium powder (stal	oilised)	
Long-term – systemic effects, oral	7,9 mg/kg/day	
PNEC (Water) aliminium powder (stabilised)		
PNEC aqua (freshwater)	74,9 mg/L	
PNEC (Sewage treatment plant) aliminium powder (stabilised)		
PNEC sewage treatment plant	20 mg/L	
DNEL/DMEL (Consumer) titanium		
Long-term – systemic effects, oral	350 mg/kg/day	
PNEC (Water) titanium		
PNEC aqua (freshwater)	0,076 mg/L	
PNEC aqua (marine water)	0,6 mg/L	
PNEC aqua (fresh water sediment)	600 mg/kg dry weight	
PNEC aqua (marine water sediment)	60 mg/kg dry weight	
PNEC aqua (aqua intermittent)	0,37 mg/L	
PNEC (Sewage treatment plant) titanium		
PNEC sewage treatment plant	60 mg/L	
PNEC (soil) titanium		
PNEC soil	60 mg/kg/ dry weight	

8.1.5. Control banding

No additional information available

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8.2. Exposure controls

8.2.1. Appropriate engineering controls

Appropriate engineering controls:

Dust must be extracted directly at the point of origin. Use only in well-ventilated areas.

8.2.2. Personal protection equipment

Personal protective equipment:

Avoid all unnecessary exposure.

Personal protective equipment symbol(s):







8.2.2.1. Eye and face protection

Eye protection:

Wear approved safety goggles. Chemical goggles should be consistent with EN166 or equivalent

8.2.2.2. Skin protection

Skin and body protection:

Wear suitable coveralls to prevent exposure to the skin. Dust production: dust mask with filter type P3

Hand protection:

Wear protective gloves. Appropriate material: butyl rubber; nitrile rubber.

Other skin protection

Materials for protective clothing:

Wear suitable protective clothing. safety foot-wear

8.2.2.3. Respiratory protection

Respiratory protection:

Wear appropriate mask

8.2.2.4. Thermal hazards

No additional information available

8.2.3. Environmental exposure controls

Other information:

Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Solid Colour Grey Appearance Powder Odour Odourless Odour threshold : Not applicable Melting point : Not available Freezing point : Not available **Boiling point** : Not available Flammability : Flammable Explosive limits : Not applicable Lower explosion limit 60 g/m³ : Not applicable Upper explosion limit : Not available Flash point Auto-ignition temperature : Not available : Not available Decomposition temperature

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рΗ : Not available pH solution : Not available Viscosity, kinematic : Not applicable Viscosity, dynamic Not applicable Not soluble in water Solubility Partition coefficient n-octanol/water (Log Kow) Not available Partition coefficient n-octanol/water (Log Pow) : Not applicable Vapour pressure Not available Vapour pressure at 50°C : Not available Density : Not available Relative density : $4.4 - 4.5 \text{ g/cm}^3$ Relative vapour density at 20°C : Not available : Not available Particle size : 15 — 75 µm Particle size distribution : Not available Particle shape Particle aspect ratio : Not available Particle aggregation state : Not available Particle agglomeration state : Not available Particle specific surface area : Not available Particle dustiness : Not available

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Smouldering temperature : > 400 °C

Minimum Ignition Energy (MIE) (with Inductivity) : 300 mJ < MIE < 1000 mJ

Minimum Ignition Energy (MIE) (without Inductivity) : MIE > 1000 mJ

Burning Class : At 20 °C - ("BZ") and 100 °C - ("BZ") 4

Kst : 36 bar*m/s

9.2.2. Other safety characteristics

Relative evaporation rate (butylacetate=1) : Not determined

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Stable under normal conditions of use. Catches fire spontaneously if exposed to air.

10.3. Possibility of hazardous reactions

No data available.

10.4. Conditions to avoid

Extremely high or low temperatures. Avoid ignition sources. Explosive dust-air mixtures may form. Direct sunlight. Do not allow contact with air. Open flame. Overheating. Heat. Sparks.

10.5. Incompatible materials

Explosive substances and articles. Acids. Strong alkalis. Strong oxidizing agents. Halogenated compounds. Strong acids. Strong bases.

10.6. Hazardous decomposition products

Hydrogen. Fume. Carbon monoxide. Carbon dioxide.

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SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity (oral) : Not classified
Acute toxicity (dermal) : Not classified
Acute toxicity (inhalation) : Not classified

Titanium (7440-32-6)

LD50 oral rat > 5000 mg/kg bodyweight Animal: rat, Animal sex: female, Guideline: OECD Guideline

425 (Acute Oral Toxicity: Up-and-Down Procedure), Guideline: EPA OPPTS 870.1100

(Acute Oral Toxicity)

Aluminum (7429-90-5)

Additional information

LC50 Inhalation - Rat > 0.888 mg/l/4h

Skin corrosion/irritation : Not classified

pH: Not determined

Additional information : Based on available data, the classification criteria are not met

Serious eye damage/irritation : Not classified pH: Not determined

: Based on available data, the classification criteria are not met

Respiratory or skin sensitisation : Not classified

Additional information : Based on available data, the classification criteria are not met

Germ cell mutagenicity : Not classified

Additional information : Based on available data, the classification criteria are not met

Carcinogenicity : Not classified

Additional information : Based on available data, the classification criteria are not met

Reproductive toxicity : Not classified

Additional information : Based on available data, the classification criteria are not met

STOT-single exposure : Not classified

Additional information : Based on available data, the classification criteria are not met

STOT-repeated exposure : Not classified

Additional information : Based on available data, the classification criteria are not met

Aspiration hazard : Not classified

Additional information : Based on available data, the classification criteria are not met

EOS Titanium Ti64 Grade 5/ Ti64 Grade 23

Viscosity, kinematic Not applicable

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

No additional information available

11.2.2. Other information

Potential Adverse human health effects and

: Based on available data, the classification criteria are not met

symptoms

SECTION 12: Ecological information

12.1. Toxicity

Hazardous to the aquatic environment, short-term

: Not classified

(acute)

Hazardous to the aquatic environment, long-term

: Not classified

(chronic)

Titanium (7440-32-6)

EC50 72h - Algae [1] > 10000 mg/l Test organisms (species): Skeletonema costatum

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12.2. Persistence and degradability

EOS	Titanium	Ti64 Grad	e 5/ Ti64	Grade 23

Persistence and degradability Not established.

12.3. Bioaccumulative potential

EOS Titanium Ti64 Grade 5/ Ti64 Grade 23		
Partition coefficient n-octanol/water (Log Pow) Not applicable		
Bioaccumulative potential	Not established.	

12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

No additional information available

12.6. Endocrine disrupting properties

No additional information available

12.7. Other adverse effects

Additional information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product/Packaging disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Dispose of

contents/container to hazardous or special waste collection point, in accordance with local,

regional, national and/or international regulation.

Additional information : Handle empty containers with care because residual vapours are flammable.

Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / ADN / RID

ADR	IMDG IATA		ADN	RID
14.1. UN number or ID n	umber			
UN 3089	UN 3089	UN 3089	UN 3089	UN 3089
14.2. UN proper shippin	g name			
METAL POWDER, FLAMMABLE, N.O.S.	AMETAL POWDER, METAL POWDER, FLAMMABLE, N.O.S. FLAMMABLE, N.O.S.		METAL POWDER, FLAMMABLE, N.O.S.	METAL POWDER, FLAMMABLE, N.O.S.
Transport document descr	iption			
UN 3089 METAL POWDER, FLAMMABLE, N.O.S., 4.1, II, (E)	UN 3089 METAL POWDER, FLAMMABLE, N.O.S., 4.1, II, (E)	UN 3089 METAL POWDER, FLAMMABLE, N.O.S., 4.1, II, (E)	UN 3089 METAL POWDER, FLAMMABLE, N.O.S., 4.1, II	UN 3089 METAL POWDER, FLAMMABLE, N.O.S., 4.1, II
14.3. Transport hazard	14.3. Transport hazard class(es)			
4.1	4.1	4.1	4.1	4.1

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ADR	IMDG	IATA	ADN	RID
14.4. Packing group				
II	II	II	II	II
14.5. Environmental ha	zards			
Dangerous for the environment: No	Dangerous for the environment: No Marine pollutant: No	Dangerous for the environment: No	Dangerous for the environment: No	Dangerous for the environment: No
No supplementary information	on available	ı	ı	I

14.6. Special precautions for user

Overland transport

Classification code (ADR) : F3
Special provisions (ADR) : 552
Limited quantities (ADR) : 1kg
Excepted quantities (ADR) : E2

Packing instructions (ADR) : P002, IBC08

Special packing provisions (ADR) : B4

Mixed packing provisions (ADR) : MP11

Portable tank and bulk container instructions (ADR) : T3

Portable tank and bulk container special provisions : TP33

(ADR)

Tank code (ADR) : SGAN
Vehicle for tank carriage : AT
Transport category (ADR) : 2
Special provisions for carriage - Packages (ADR) : V11
Hazard identification number (Kemler No.) : 40

Orange plates

40 3089

Tunnel restriction code (ADR) : E EAC code : 4Y

Transport by sea

: 1 kg Limited quantities (IMDG) Excepted quantities (IMDG) : E2 Packing instructions (IMDG) P002 Special packing provisions (IMDG) PP38 IBC packing instructions (IMDG) IBC08 IBC special provisions (IMDG) B21, B4 Tank instructions (IMDG) Т3 **TP33** Tank special provisions (IMDG) EmS-No. (Fire) F-G S-G EmS-No. (Spillage) Stowage category (IMDG) Α Stowage and handling (IMDG) H1

Segregation (IMDG) : SG17, SG32, SG35, SG36, SG52, SG25, SG26

Properties and observations (IMDG)

If uncoated it possesses the property of evolving hydrogen gas when in contact with water,

especially seawater; if treated with oil or wax it does not at ordinary temperatures. Reacts readily with acids and caustic alkalis, evolving hydrogen, a flammable gas. Reacts readily with iron oxide, producing a thermite effect. May form explosive mixtures with oxidizing substances. In the event of breakage of receptacles, the scattered powder is readily ignited by specific or specific are specificated as a particular attraction.

by sparks or open flame and may give rise to an explosive atmosphere.

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Air transport

PCA Excepted quantities (IATA) : E2 PCA Limited quantities (IATA) : Y441 PCA limited quantity max net quantity (IATA) : 5kg PCA packing instructions (IATA) : 445 PCA max net quantity (IATA) : 15kg CAO packing instructions (IATA) : 448 CAO max net quantity (IATA) : 50kg : A3, A803 Special provisions (IATA) ERG code (IATA) : 31

Inland waterway transport

Classification code (ADN) : F3
Special provisions (ADN) : 552
Limited quantities (ADN) : 1 kg
Excepted quantities (ADN) : E2
Equipment required (ADN) : PP
Number of blue cones/lights (ADN) : 1

Rail transport

Classification code (RID): F3Special provisions (RID): 552Limited quantities (RID): 1kgExcepted quantities (RID): E2

Packing instructions (RID) : P002, IBC08

Special packing provisions (RID) : B4
Mixed packing provisions (RID) : MP11
Portable tank and bulk container instructions (RID) : T3
Portable tank and bulk container special provisions : TP33

(RID)

Tank codes for RID tanks (RID) : SGAN
Transport category (RID) : 2
Special provisions for carriage – Packages (RID) : W1
Colis express (express parcels) (RID) : CE10
Hazard identification number (RID) : 40

14.7. Maritime transport in bulk according to IMO instruments

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

REACH Annex XVII (Restriction List)

Contains no substance(s) listed on REACH Annex XVII (Restriction Conditions)

REACH Annex XIV (Authorisation List)

Contains no substance(s) listed on REACH Annex XIV (Authorisation List)

REACH Candidate List (SVHC)

Contains no substance(s) listed on the REACH Candidate List

Explosives Precursors Regulation (2019/1148)

Contains substance(s) listed on the Explosives Precursors list (Regulation EU 2019/1148 on the marketing and use of explosives precursors)

ANNEX II REPORTABLE EXPLOSIVES PRECURSORS

List of substances on their own or in mixtures or in substances for which suspicious transactions and significant disappearances and thefts are to be reported to the relevant national contact point within 24 hours.

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Name	CAS-No.	Nomenclature	Combined Nomenclature code for mixture without constituents which would determine classification under another CN code
Aluminium, powders	7429-90-5	7603 10 00; ex 7603 20 00	

Please see https://ec.europa.eu/home-affairs/system/files/2021-11/list_of_competent_authorities_and_national_contact_points_en.pdf

15.1.2. National regulations

No additional information available

15.2. Chemical safety assessment

No chemical safety assessment has been carried out

SECTION 16: Other information

Indication of changes:

According to Regulation (EU) 2015/830, 2020/878 (REACH Annex II).

Sources of Key data : Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16

December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation

(EC) No 1907/2006 (et sequens).

Other information : None.

Full text of H- and EUH-statements:		
Flam. Sol. 1 Flammable solids, Category 1		
H228	Flammable solid.	
H261	In contact with water releases flammable gases.	
Water-react. 2 Substances and Mixtures which, in contact with water, emit flammable gases, Category 2		

Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]:		
Flam. Sol. 1	H228	Calculation method

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This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

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