

SAFETY INFORMATION SHEET (SIS)

SANERGY™

Version 01, 2026-07-17

1. Identification of substance and company

1.1. Product identifier

Product name: Sanergy™ LT 316L, Sanergy™ LT 304L, Sanergy™ LT Ti and Sanergy™ HT 441.
Stainless steel and titanium for low/high temperature fuel cells coated with Ti, C, Ce, Co and/or Al.

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

This is a single- or double side coated stainless-steel product delivered in coil. Sanergy LT is used in low temperature PEM fuel cells with operating temperatures up to 100°C. Sanergy HT is used in high temperature SOFC, operating in temperatures up to 800°C. The product is intended to be formed into a bipolar plate (Sanergy™ LT) or interconnect (Sanergy™ HT) by a stamping/pressing operation. Plates may be joined by a welding process.

1.3. Details of the supplier of the safety information sheet

Manufacturer and supplier:

Alleima StripTech AB

S-811 81 SANDVIKEN

Sweden

Tel: +46 26 426 00 00

Website: www.alleima.com

Contact: ehs.miljoskydd@alleima.com

1.4. Emergency information

In case of emergency, contact your local authority advisor.

2. Hazards identification

2.1.1 Classification of the substrate

This classification applies to 316L, 304L and 441. For Titanium Grade 1, Table 1 does not apply, the classification is instead “non-classification”.

Classification	Hazard statement
Carc.2	H350 May cause cancer
STOT RE 1	H372: Causes damage to organs through prolonged or repeated exposure
Skin Sens. 1	H317: May cause an allergic reaction

Table 1 Classification according to EC 1272/2008 regulation.

2.1.2 Classification of the coating

This classification applies only to products coated with Co. For Ti-, C-, Ce- and/or Al-coating, Table 2 does not apply, the classification is instead “non-classification”.

Classification	Hazard statement
Carc. 1B Repr. 1B Muta. 2 Skin Sens. 1 Resp. Sens 1 Aquatic Chronic 4	H350 May cause cancer. H360F May damage fertility. H341 Suspected of causing genetic effects. H317: May cause an allergic reaction. H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled. H413: May cause long lasting harmful effects to aquatic life.

Table 2 Classification according to EC 1272/2008 regulation.

2.2. Label elements

Since these products are massive alloys, labelling is not required.

2.3. Other hazards

Dust and fumes may be generated during processing e.g. in welding, cutting and grinding. If airborne concentrations of dust and fume are excessive, inhalation over long periods may affect workers' health, primarily of the lungs.

3. Composition/information on ingredients

3.1 Substrate material

Element	CAS number	EINECS number	Concentration wt-%	Classification	Hazard statement
Iron	7439-89-6	231-96-4	Balance	-	-
Nickel	7440-02-0	231-111-4	<10,5	Carc2 Skin Sens.1 STOT RE 1	H351: Suspected of causing cancer H317: May cause an allergic reaction H372: Causes damage to organs through prolonged or repeated exposure
Niobium	7440-03-1	231-113-5	<1	-	-
Chromium	7440-47-3	231-157-5	16,5-19,5	-	-
Manganese	7439-96-5	231-105-1	< 2	-	-
Molybdenum	7439-98-7	231-107-2	<2,5	-	-
Silicon	7440-21-3	231-130-8	<1,0		
Carbon	7782-42-5	231-955-3	<0,030		
Phosphorus	7723-14-0	231-768-7	<0,045		
Sulfur	7704-34-9	231-722-6	<0,015		
Titanium (in alloy)	7440-32-6	231-142-3	<0,60		

Titanium (Grade 1)	7440-32-6	231-142-3	> 98		
Nitrogen	7440-32-6	231-783-9	<0,10		

Table 3. Composition and classification of substrate material according to EC 1272/2008 regulation.

3.2 Coating material

Element	CAS number	EINECS number	Layer thickness (µm)	Classification	Hazard statement
Carbon	7782-42-5	231-955-3	< 1		
Titanium	7440-32-6	231-142-3	< 1		
Cerium	7440-45-1	231-154-9	< 1		
Cobalt	7440-48-4	231-158-0	< 1	Carc. 1B Repr. 1B Muta. 2 Skin Sens. 1 Resp. Sens 1 Aquatic Chronic 4	H350 May cause cancer. H360F May damage fertility. H341 Suspected of causing genetic effects. H317: May cause an allergic reaction. H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled. H413: May cause long lasting harmful effects to aquatic life.
Aluminium	7429-90-5	231-072-3	< 2		

Table 4. Composition and classification of coating material according to EC 1272/2008 regulation.

4. First aid measures

4.1. Description of first aid measures

Medical attention should be sought in case of an excessive inhalation of dust, a physical injury to the skin or to the eyes.

4.2. Most important symptoms and effects both acute and delayed

No relevant information has been identified.

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

No relevant information has been identified.

5. Firefighting measures

5.1. Extinguishing media

Titanium and titanium alloy in massive form are not combustible but material in the form of small chips, fine turnings or dust can self-ignite in moist air.

If possible; allow fire to burn out. Fire can be controlled by covering with powder from type D fire extinguisher, sand, or dry table salt. Carbon dioxide is not effective. Water applied to burning titanium may cause an explosion.

5.2. Special hazards arising from the mixture

Care should be taken to avoid exposing small chips, fine turnings and process dust (e.g. from grinding and blasting operations) to air and fire (auto ignition temperature 250°C/480 F for powders).

5.3. Advice for firefighters

Dry titanium burns slowly while releasing much heat. Piled chips may burn vigorously.

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Not applicable for the product in massive form.

For fines and dust; wear appropriate respiratory and protective equipment specified in section 8. Isolate spill area and provide ventilation. Avoid breathing dust or fume. Avoid contact with skin and eyes.

6.2. Environmental precautions

Not applicable for the product in massive form. For fines and dust; do not allow to be released to the environment.

6.3. Methods and material for containment and cleaning up

Not applicable for the product in massive form. For fines and dust; clean spills in a manner that not disperse dust into the air. Sweep or scoop up. Place in an appropriate container for further handling and disposal.

6.4 Reference to other sections

None.

7. Handling and storage

7.1. Precautions for safe handling

There are no special technical measures involved for handling of products in massive form. Normal precautions should be taken to avoid physical injury from coiled or bundled products, possibly with sharp edges.

Machining operations require the use of cutting fluids to reduce the temperature of waste material which might ignite without coolant.

7.2. Conditions for safe storage, including any incompatibilities

The product is stable in storage. However, it should be kept in mind that the products may display sharp edges and a sufficiently robust place capable of carrying the significant weight of the products should be used for storage.

7.3. Specific end uses

None identified.

8. Exposure controls/personal protection

8.1. Control parameters

Elements	TD	ID	RD
Aluminium as Al			2
Iron oxide as Fe			3,5
Manganese and its inorganic compounds as Mn		0,2	0,05
Chromium and its compounds as Cr	0,5		
Nickel as Ni	0,5		
Cobalt and its inorganic compounds as Co		0,02	
Molybdenum as Mo	10		5

Table 5 Occupational Exposure Limits, NGV, (mg/m³) in Sweden.

NGV=Nivågränsvärde(One working day exposure)

TD=Total dust

ID= Inhalable dust

RD=Respirable dust

8.2. Exposure controls

8.2.1. Appropriate engineering controls

In the processing of all metallic materials, exposure to fumes and dust must be kept below any legally imposed limits.

Dust and fume may be generated in use, e.g. by cutting, grinding and welding processes, which may contain materials subject to exposure limits. To ensure these limits are not exceeded, adequate general or local ventilation or fume extraction should be provided.

8.2.2. Individual protection measures, such as personal protective equipment

In accordance with European and national health and safety regulations, it is necessary to assess the need for personal protection equipment and appropriate approved respiratory protection should be provided for those workers at risk of inhalation. Suitable hand and eye protection should be worn where there is a risk of laceration, flying particles, welding heat radiation or contact with oils during processing. The process of welding should only be performed by trained workers with personal protective equipment in accordance with the laws of each member state relating to safety.

8.2.3. Environmental Exposure Controls

Emissions from ventilation or equipment in the workplace should be controlled to assure that environmental legislation is fulfilled.

9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Stainless steel:

Appearance: Solid; metallic grey, ranging from dull to bright polished. Occasionally supplied with oxidized, blue/black surfaces.

Odour: Odorless

Water solubility: Insoluble

Melting: 1300°C–1520°C

Density: 7.7 – 8.0 g/cm³



Thermal expansion (mean value 20-100°C): $10\text{--}17 \times 10^{-6} \text{ }^{\circ}\text{C}^{-1}$

Thermal conductivity (RT): 10–25 W/m °C

Magnetic: Sanergy™ LT 316L/304L are non-magnetic (paramagnetic) and Sanergy™ HT 441 is magnetic (ferromagnetic).

Titanium Grade 1:

Appearance: Solid; metallic grey, ranging from dull to bright polished. Occasionally supplied with oxidized, blue/black surfaces.

Odour: Odorless

Water solubility: Insoluble

Melting: 1655-1685°C

Density: 4.5 g/cm³

Thermal expansion (mean value 20-100°C): $8.6 \times 10^{-6} \text{ }^{\circ}\text{C}^{-1}$

Thermal conductivity (RT): 16-20.8 W/ m·K

Magnetic: No

Titanium coating:

Appearance: Solid; metallic grey

Odour: Odorless

Water solubility: Insoluble

Melting: 1655-1685°C

Density: 4.5 g/cm³

Thermal expansion (mean value 20-100°C): $8.6 \times 10^{-6} \text{ }^{\circ}\text{C}^{-1}$

Thermal conductivity (RT): 16-20.8 W/ m·K

Magnetic: No (paramagnetic)

Carbon coating (graphite like carbon):

Appearance: Iron-black to steel-gray

Odour: Odorless

Water solubility: Insoluble

Melting: 3650–3697 °C

Density: 2.09–2.25 g/cm³

Thermal expansion (mean value 20-100°C): $0.6 - 4.3 \times 10^{-6} / ^{\circ}\text{C}$

Thermal conductivity (RT): 1.82 to 388 W/ m·K

Magnetic: No (diamagnetic)

Cerium coating:

Appearance: metallic grey

Odour: Odorless

Water solubility: Insoluble

Melting: 795–799 °C

Density: 6.77–6.78 g/cm³ (at 20 °C)

Thermal expansion (mean value 20-25°C): $6.1\text{--}6.3 \times 10^{-6} / ^{\circ}\text{C}$

Thermal conductivity (RT): 11.3 W/m·K

Magnetic: No (paramagnetic)

Cobalt coating:

Appearance: metallic grey

Odour: Odorless

Water solubility: Insoluble

Melting: 1495 °C

Density: 8.83–8.90 g/cm³ at 20–25 °C

Thermal expansion (mean value 20-100°C): 12.5×10^{-6} /°C

Thermal conductivity (RT): 69–100 W/m·K

Magnetic: Yes (ferromagnetic)

Aluminium coating:

Appearance: Silvery-white

Odour: Odorless

Water solubility: Insoluble

Melting: 660.3 °C

Density: 2.70 g/cm³

Thermal expansion (mean value 20-100°C): 23.1×10^{-6} /°C

Thermal conductivity (RT): 237 W/m·K

Magnetic: No (paramagnetic)

9.2. Other information

Not explosive.

10. Stability and reactivity

10.1. Reactivity

The products in massive form are stable and non-reactive under normal ambient atmospheric conditions. Fines shall be kept away from open flame and heat.

10.2. Chemical stability

The products in massive form are stable and non-reactive under normal ambient atmospheric conditions.

10.3. Possibility of hazardous reactions

Metallic or metal oxide fumes and dust may be produced during welding, grinding or cutting operations.

10.4. Conditions to avoid

Avoid creating or accumulating fines or dust.

10.5. Incompatible materials

Fines may react in contact with oxygen, acids and strong oxidizing agents releasing gaseous acid decomposition products, e.g. hydrogen, oxides of nitrogen.

10.6. Hazardous decomposition products

See section 10.3. and 10.5.

11. Toxicological information

11.1. Information on toxicological effects

Acute toxicity

The products are not acute toxic.

Irritation

The exposure route of concern is inhalation. These products are, in massive form, not capable of being inhaled.

Corrosivity

The products are not corrosive to skin.

Sensitization

Nickel and Cobalt are classified as skin sensitizers.

Repeated dose toxicity

During mechanical working, flame cutting or welding, dust, or fumes may be formed. Inhalation of excessive airborne particles may have long term health effects, primarily affecting the lungs.

Carcinogenicity

Nickel and Cobalt are classified as carcinogenic.

Mutagenicity

Cobalt is classified as mutagenic.

Toxicity for reproduction

Cobalt is classified as toxic for reproduction.

12. Ecological information

12.1. Toxicity.

Cobalt may cause long lasting harmful effects to aquatic life.

12.2. Persistence and degradability

No data.

12.3. Bioaccumulative potential

No data.

12.4. Mobility in soil

Not soluble in water.

12.5. Results of PBT and vPvB assessment

Not relevant.

12.6. Other adverse effects

Do not allow material to be released to the environment without proper governmental permits. No further relevant information is available.

13. Disposal considerations

13.1 Waste treatment methods

Surplus and scrap (waste) are valuable commodities. Recycling routes are well-established, and recycling is therefore the preferred disposal route. Due to the fire hazards of fines and dust these shall be properly collected and placed in an appropriate container for further handling and disposal.

14. Transport information

No special precautions are required.

The product is not classified as hazardous for transport.

15. Regulatory information

15.1. Safety, health and environmental regulation/legislation specific for the mixture

None.

15.2. Chemical safety assessment

No chemical safety assessment has been published.

16. Other information

EU

Regulations are given in:

-Reach regulation – EC 1907/2006

-Classification, Labelling and Packaging regulation EC 1272/2008.

Declaration

The information given in this safety information sheet is based on the present level of our knowledge and experience. The data sheet describes the products with respect to safety requirements. The data given is not intended as a confirmation of product properties and does not constitute a legal contractual relationship, nor should it be used as the basis for ordering these products.