SAFETY DATA SHEET (SDS)

According to Regulation (EC) No. 1907/2006 Art. 31

Creation date: 2026-Apr-09
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Version: 1.0

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

1.1 Product identifier

Product form: Mixture

Trade name: AISI 316L MIM <20 µm

Synonyms: Stainless Steel AISI 316L powder, EN 1.4404 powder

Type of product: Alloy metal powder (spherioidal / spherical)

UFI: Not applicable

REACH status: Mixture – constituents registered under REACH

Component	CAS No.	EC No.	REACH Registration No.
Iron	7439-89-6	231-096-4	01-2119462838-24-XXXX
Chromium	7440-47-3	231-157-5	01-2119485652-31-XXXX
Nickel	7440-02-0	231-111-4	01-2119438727-29-XXXX
Molybdenum	7439-98-7	231-107-2	01-2119472304-43-XXXX

1.2 Relevant identified uses of the substance and uses advised against

Identified uses:

- Metal Injection Moulding
- Laboratory and industrial R&D applications

Uses advised against:

- Any use outside industrial settings or processes with adequate dust control and ventilation.
- Additive manufacturing unless specifically qualified for the process
- Consumer use
- Any use involving open handling without dust collection or respiratory protection
- Applications resulting in uncontrolled inhalation of airborne powder

1.3 Details of the supplier of the SDS

Company Name: Ultra Metal Powders Sp. z o. o.
Address: Ul. Marsz. Józefa Piłsudskiego 74 lok. 320, 50-020 Wrocław, Poland
Phone: +48 733 500 574
Email of competent person: mateusz.skalon@umpowders.com

1.4 Emergency telephone number

Emergency number: +48 (0) 42 631 47 24 (Poison Information Center, Łódź, Poland)

Available Mon–Fri 8:00–17:00 (CET)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

According to Regulation (EC) No 1272/2008 (CLP), AISI 316L stainless steel powder is not classified as a hazardous substance.

However, airborne fine powder may present:

- Risk of mechanical irritation to the respiratory system
- Dust explosion hazard when dispersed in air and exposed to ignition sources

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 (CLP):
The substance does not require hazardous classification or labelling.

Additional labelling (recommended for powdered metals):

- EUH210: Safety data sheet available on request

- EUH208 (if Ni content ≥ 1%): Contains nickel. May cause an allergic skin reaction in sensitized individuals.
- Dust explosion warning: Fine metallic powders may form explosive mixtures with air.

Pictograms: Not required

Signal word: Not required

Precautionary statements (recommended):

- P280: Wear protective gloves/eye protection/respiratory protection
- P261: Avoid inhalation of dust
- P210: Keep away from heat/sparks/open flames/hot surfaces
- P370+378: In case of fire: Use dry sand, Class D extinguisher or metal fire powder

2.3 Other hazards

- **Dust explosion risk:** Powder can form explosive dust–air mixtures. Avoid generation of airborne dust, and use only with appropriate extraction and grounding of equipment.
- **Respiratory hazard:** Inhalation of fine particles may cause mechanical irritation. Long-term inhalation of stainless steel dust containing nickel or chromium compounds may cause sensitization or allergic reactions.
- **Environmental:** Material is not classified as environmentally hazardous, but avoid uncontrolled release of powder into soil or water.

PBT/vPvB assessment: The substance is not classified as PBT or vPvB.

SECTION 3: Composition/information on ingredients

3.1 Substances

AISI 316L is an alloyed stainless steel powder produced by gas atomization.
It consists mainly of iron with chromium, nickel, and molybdenum as principal alloying elements.

Component	CAS No.	EC No.	Weight % (typical)
Iron (Fe)	7439-89-6	231-096-4	Balance
Chromium (Cr)	7440-47-3	231-157-5	16.0 – 18.0%
Nickel (Ni)	7440-02-0	231-111-4	10.0 – 14.0%
Molybdenum (Mo)	7439-98-7	231-107-2	2.0 – 3.0%
Manganese (Mn)	7439-96-5	231-105-1	≤ 2.0%
Silicon (Si)	7440-21-3	231-130-8	≤ 1.0%
Carbon (C)	7440-44-0	231-153-3	≤ 0.03%
Phosphorus (P)	7723-14-0	231-768-7	≤ 0.045%
Sulfur (S)	7704-34-9	231-722-6	≤ 0.030%

Impurities: May contain trace quantities of oxygen or inert gas from atomization.

Does not contain intentionally added nanoparticles.

Classification: None of the alloy components are present at concentrations leading to classification of the substance as hazardous under Regulation (EC) No 1272/2008.

SECTION 4: First aid measures

4.1 Description of first aid measures

General information:

- Seek medical attention if symptoms persist.
- Remove contaminated clothing and wash before reuse.
- Exposure is primarily mechanical irritation from dust, not chemical toxicity.

After inhalation:

- Remove victim to fresh air and keep at rest.
- Rinse mouth and blow nose to remove dust.
- If breathing difficulties occur, seek medical attention.
- For high dust exposure or symptoms of metal fume fever (very rare, only if thermally oxidized fumes are inhaled), obtain medical care.

After skin contact:

- Wash skin with soap and water.
- Metallic particles may cause minor abrasion or irritation.
- If skin irritation persists or signs of allergic reaction occur (possible with nickel-sensitive individuals), seek medical advice.

After eye contact:

- Rinse cautiously with clean water for several minutes.
- Remove contact lenses if present and easy to do.
- Do not rub eyes — mechanical abrasion is possible.
- Seek medical attention if irritation or redness persists.

After ingestion:

- Rinse mouth with water.
- Do not induce vomiting.
- Material is not expected to be acutely toxic, but seek medical attention if discomfort occurs

4.2 Most important symptoms and effects, both acute and delayed

- Mechanical irritation of eyes or respiratory tract from airborne powder
- Coughing or short-term breathing discomfort after inhalation of dust
- Skin irritation possible with nickel-sensitive individuals
- No known acute systemic toxicity from ingestion of small quantities

4.3 Indication of any immediate medical attention and special treatment needed

No specific antidote required.

Treat symptomatically based on clinical judgement.

In case of inhalation of thermal spray fumes, provide medical evaluation for potential metal fume exposure.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media:

- Dry sand
- Class D metal fire extinguishing powder
- Salt-based extinguishing agents
  These agents smother burning metal and prevent oxygen contact.

Unsuitable extinguishing media:

- Water
- Foam
- Carbon dioxide (CO_2)
- Dry chemical ABC extinguishers

Contact with water or CO_2 can cause violent reactions, hydrogen generation, or metal dust dispersion.

5.2 Special hazards arising from the substance

Fine metal powders may ignite if dispersed in air and exposed to heat, sparks, or flames.

Burning metal powder may release metal oxides and irritating fumes.

Dust clouds can form **explosive dust–air mixtures.**

Molten metal can react violently with water, producing steam explosions.

High temperatures in confined spaces may cause pressure buildup.

5.3 Advice for firefighters

- Fight fire from a safe distance with suitable extinguishing media.
- Wear self-contained breathing apparatus (SCBA).
- Use protective clothing resistant to heat and metals.
- Prevent dust dispersion—avoid using high-pressure extinguishing streams.
- Cool nearby equipment with water spray only if no powder is present.
- Do not allow runoff to enter drains or watercourses.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel:

- Avoid creating dust; do not sweep dry.
- Keep away from ignition sources and heat.
- Wear respiratory protection (P3 or N100 filter), gloves, and safety goggles.
- Ensure adequate ventilation or local extraction.
- Prevent skin and eye contact.

For emergency responders:

- Wear antistatic protective clothing and suitable respirator.
- Avoid using compressed air or high-pressure air hoses — they disperse dust.
- Prevent dust cloud formation to avoid explosion hazard.

6.2 Environmental precautions

- Prevent powder from entering drains, watercourses, or soil.
- Collect spilled material before cleaning surfaces with water.
- Dispose of waste in accordance with local/regional/national regulations.

6.3 Methods and materials for containment and cleaning up

Preferred cleaning method:

- Pick up mechanically using a vacuum equipped with a **HEPA filter**.
- If vacuuming is not possible, use dampened (not wet) sweeping methods to prevent dust.
- Transfer recovered material to suitable sealed containers.

Do not:

- Dry sweep

- Use water or compressed air
- Dispose as general household waste

6.4 Reference to other section

- For personal protective equipment: see **Section 8.**
- For disposal considerations: see **Section 13.**
- For fire precautions: see **Section 5**.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

- Avoid formation of airborne dust; use local exhaust ventilation or dust collection.
- Handle only in well-ventilated areas.
- Ground and bond equipment to prevent electrostatic discharge.
- Keep away from ignition sources, open flames, and high temperatures.
- Avoid breathing dust; wear an appropriate respirator (P3 / N100).
- Avoid contact with skin and eyes.
- Use non-sparking, antistatic tools when handling bulk powder.
- Do not use compressed air to clean surfaces or clothing.
- Prevent contamination with oxidizing agents or moisture.
- Wash hands and exposed skin after handling.

Hygiene measures:

- No eating, drinking, or smoking in areas where powder is handled.
- Remove contaminated clothing and wash before reuse.

Dust explosion prevention:

- Ensure dust extraction and filtration systems are functional.
- Maintain housekeeping to prevent powder accumulation.

- Avoid dispersing powder into the air.

7.2 Conditions for safe storage, including any incompatibilities

- Store in tightly sealed, original containers.
- Keep in a cool, dry, well-ventilated area.
- Protect from humidity, water, and strong oxidizers.
- Store away from acids, strong bases, and chlorinated solvents.
- Avoid mechanical damage to packaging.
- Containers should be electrically grounded during transfer.
- Prevent accumulation of spilled material in storage areas.

Temperature / pressure conditions:

- Ambient temperature; no special pressure requirements.
- Avoid heat sources, sparks, welding operations near stored powder.

7.3 Specific end uses

- Powder designed for High Velocity Oxy-Fuel (HVOF), High Velocity Air Fuel (HVAF), and related thermal spray technologies.
- Use only in industrial environments with proper ventilation and powder handling systems.
- Not intended for consumer use or open burning.

SECTION 8: Exposure controls/personal protection

8.1 Parameters to be monitored

Substance	EU / National OEL (inhalable dust)	EU / National OEL (respirable dust)
Metal dust, inert/nuisance	10 mg/m³	4 mg/m³
Nickel (metal)	0.5 mg/m³	–
Chromium (metal)	2.0 mg/m³	–
Manganese (fume, respirable)	0.2 mg/m³	–

Note: Limits vary by country; local regulations must be consulted.

8.2 Exposure controls

8.2.1 Appropriate engineering controls

- Use local exhaust ventilation (LEV) or dust extraction when transferring, sieving, spraying, or cleaning.
- Enclose processes to minimize airborne dust.
- Use HEPA-filtered vacuum systems for cleaning.
- Ground and bond equipment to prevent static discharge.
- For thermal spraying: ensure fume extraction according to industrial hygiene standards.

8.2.2 Individual protection measures

Eye/face protection:

- Safety goggles (EN 166) with side shields
- Face shield recommended for high-dust environments or thermal spray operations

Skin protection:

- Protective gloves resistant to abrasion (nitrile, leather, or PVC)
- Antistatic, long-sleeve clothing recommended
- Wash skin after handling powders

Respiratory protection:

- When dust may be generated:
    - P3 filter (EU) or N100 (US) respirator
- For thermal spraying:
    - Positive-pressure air-fed respirator or welding fume respirator depending on workplace assessment

Hygiene measures:

- No eating, drinking, or smoking in handling areas
- Wash hands after handling
- Remove contaminated clothing and wash before reuse

8.2.3 Environmental exposure controls

- Prevent powder release to wastewater, soil, or drains
- Collect spills using HEPA-filtered vacuum or wet wiping
- Dispose of collected powder as metal waste (see Section 13)

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Property	Value / Description
Physical state	Solid metal powder
Appearance	Metallic, grey to silver spherical particles
Odour	Odourless
Particle size distribution	<20 µm
Melting point / range	~1370 – 1400 °C
Boiling point	Not applicable (solid metal)
Density (bulk apparent)	~3.5 – 4.5 g/cm³ (typical, depends on PSD)
Density (solid)	~7.9 – 8.0 g/cm³
Solubility in water	Insoluble

Vapour pressure	Not applicable
Vapour density	Not applicable
pH	Not applicable (solid)
Flash point	Not applicable (inorganic solid)
Auto-ignition temperature	Not self-igniting – fine powder may ignite when dispersed in air
Flammability	Not flammable in bulk form; fine powder may form explosive dust-air mixtures
Explosive properties	Dust explosion hazard when dispersed in air and exposed to ignition sources
Oxidising properties	Not classified as oxidising
Electrical conductivity	Conductive (risk of static discharge if airborne dust accumulates)
Partition coefficient (n-octanol/water)	Not applicable
Decomposition temperature	Not applicable

9.2 Other information

- Fine metallic powders can accumulate electrostatic charge.
- Dust cloud in confined space may ignite explosively.
- Hygroscopic behavior: material is not hygroscopic, but moisture can cause clumping and handling issues.

SECTION 10: Stability and reactivity

10.1 Reactivity

- In bulk form, the material is stable and non-reactive.
- **Fine powder may ignite or explode if dispersed in air and exposed to ignition sources.**
- Reacts with strong oxidizing agents.

10.2 Chemical stability

- Stable under normal storage and handling conditions.
- Not self-reactive.
- Not sensitive to shock in bulk form.

10.3 Possibility of hazardous reactions

- Dust–air mixtures may form explosive atmospheres.
- Contact with strong oxidizers may result in violent reactions.
- Molten metal can react violently with water, causing steam explosions.

10.4 Conditions to avoid

- Heat, sparks, open flame, welding arcs, hot surfaces.
- Generation of airborne dust.
- Electrostatic discharge.
- Contact with moisture during storage may cause clumping.

10.5 Incompatible materials

- Strong oxidizers (nitrates, chlorates, peroxides)
- Strong acids (may release metal ions or hydrogen gas)
- Halogenated compounds

10.6 Hazardous decomposition products

- Metal oxides may be released when powder is heated above melting point or used in thermal spray processes.
- No hazardous decomposition products at normal temperatures.

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SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity:

- Not classified as acutely toxic.
- Ingestion of small quantities is not expected to be harmful, but may cause discomfort or irritation.

Skin contact:

- Metallic particles may cause mild mechanical irritation.
- Contains nickel, which may cause allergic skin reactions in sensitized individuals.

Eye contact:

- Dust may cause mechanical irritation, redness, or scratching of the cornea.

Inhalation:

- Inhalation of airborne powder may cause respiratory irritation, coughing, or discomfort.
- Long-term inhalation of stainless steel dust containing nickel or chromium compounds may cause sensitization or allergic reactions in susceptible individuals.
- Inhalation of thermal spray fumes may cause irritation; poorly controlled high-temperature processes can produce metal oxide fumes.

Skin sensitization:

- Nickel content may cause allergic reactions in sensitized persons.
- No known sensitization from iron, chromium, or molybdenum in metallic form.

Respiratory sensitization:

- Prolonged or repeated inhalation of nickel-containing dust may lead to respiratory sensitization.

Germ cell mutagenicity / Carcinogenicity:

- The product as a metallic alloy is not classified as carcinogenic.

- Some regulatory bodies classify nickel metal as carcinogenic by inhalation in certain forms.
- Exposure limits for occupational dust must be respected.

Reproductive toxicity:

- No expected reproductive or developmental toxicity from exposure to metallic form of 316L powder.

STOT – Single exposure:

- May cause mechanical irritation to respiratory tract.

STOT – Repeated exposure:

- Prolonged inhalation of fine dust may cause lung irritation or sensitization (nickel).

Aspiration hazard:

- Not applicable (solid metal powder).

SECTION 12: Ecological information

12.1 Toxicity

- The material is not classified as hazardous to the environment.
- Metallic stainless steel is generally considered inert in bulk form.
- Powder may pose short-term risk to aquatic organisms if released in large quantities due to physical smothering effects or release of metal ions over time.

12.2 Persistence and degradability

- Stainless steel is not biodegradable.
- In natural environments, gradual surface oxidation may occur but the material remains largely insoluble and stable.

12.3 Bioaccumulative potential

- No significant bioaccumulation expected for metallic alloy particles in bulk form.

- Metal ions released slowly from corrosion are not expected to bioaccumulate at levels of concern.

12.4 Mobility in soil

- Insoluble in water.
- Particles may accumulate in sediment, but mobility through soil is low.

12.5 Results of PBT and vPvB assessment

- The substance does not meet PBT or vPvB criteria according to REACH Annex XIII.

12.6 Endocrine disrupting properties

- No data indicating endocrine-disrupting characteristics.

12.7 Other adverse effects

- Dust entering watercourses may cause physical deposition or turbidity.
- Prevent uncontrolled release of powder to the environment.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product / unused powder:

- Recycle whenever possible as metallic scrap.
- Collect powder in sealed, labelled containers to prevent dust release.
- Dispose of in accordance with local, national, and regional regulations for metal waste.
- Do **not** dispose of together with household waste.
- Do **not** wash powder into drains or surface water.

Spilled or contaminated powder:

- Treat as industrial metal waste.
- Dispose through licensed waste disposal contractors.
- Avoid creating dust during collection or transport.

Waste code (example – may vary by country):

- **EWC 12 01 04** — non-ferrous metal dust and particles
- or **EWC 12 01 03** — ferrous metal filings and turnings
  (Local regulations should be checked to confirm correct code.)

Packaging:

- Empty containers may contain traces of powder; handle with care to prevent dust release.
- Clean, recycle, or dispose of packaging according to local waste regulations.

Special precautions:

- Do not use water for cleanup if powder is burning or very hot (risk of steam explosion).
- Dispose of oxidizer-contaminated or thermally affected powder separately.

SECTION 14: Transport information

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

- This substance is produced in compliance with **REACH Regulation (EC) No 1907/2006**.
- Stainless steel is considered an article/substance exempt from classification as hazardous under **CLP Regulation (EC) No 1272/2008**, when not in respirable forms containing hazardous compounds at classifiable concentrations.
- Nickel content may require workplace exposure monitoring depending on national regulations.
- Workplace dust exposure must comply with applicable **Occupational Exposure Limits (OELs)** for inhalable and respirable dust.
- No Seveso III (Directive 2012/18/EU) classification.
- Not listed as a hazardous substance under the Stockholm, Rotterdam, or Montreal protocols.
- No restrictions under REACH Annex XVII.
- Not on the REACH Candidate List of Substances of Very High Concern (SVHC).

15.2 Chemical safety assessment

- A Chemical Safety Assessment has **not** been carried out for this alloy in powder form, as it is not classified as hazardous under Regulation (EC) No 1272/2008.
- Handling and use must follow standard industrial hygiene and dust control practices

SECTION 16: Other information

16.1 Indication of changes

This Safety Data Sheet has been prepared specifically for AISI 316L stainless steel powder (<20 µm) intended for HVOF and thermal spray applications. Format and content follow Regulation (EC) No 1907/2006 (REACH) and Regulation (EC) No 1272/2008 (CLP).

16.2 Abbreviations and acronyms

- **ADR/RID** – European Agreements on the International Transport of Dangerous Goods by Road/Rail
- **CAS** – Chemical Abstracts Service
- **CLP** – Classification, Labelling and Packaging Regulation
- **EC** – European Community/Commission
- **EWC** – European Waste Catalogue
- **HEPA** – High Efficiency Particulate Air
- **IATA / ICAO** – International Air Transport Association / Organization
- **IMDG** – International Maritime Dangerous Goods Code
- **OEL** – Occupational Exposure Limit
- **PBT** – Persistent, Bioaccumulative, Toxic
- **REACH** – Registration, Evaluation, Authorisation and Restriction of Chemicals
- **vPvB** – Very Persistent, Very Bioaccumulative

16.3 Further information

The information in this SDS is based on current knowledge and applies to the product as delivered. It describes safety requirements but does not guarantee any specific product properties.

Users are responsible for ensuring safe working conditions, compliance with applicable legislation, and suitability of the material for their specific process.

16.4 Disclaimer

Ultra Metal Powders Sp. z o.o. makes no warranty, express or implied, regarding the accuracy or completeness of this information. The user assumes all responsibility for handling, storage, use, and disposal in accordance with local regulations.