

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878
Issue date: 12/8/2022 Revision date: 9/27/2022 Supersedes version of: 4/8/2021 Version: 12.0

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

1.1. Product identifier

Product form	: Mixture
Name	: GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)
Trade name	: GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)
Product code	: CL 20ES, GEAPS001-AB-Q1-02 (90020)
Type of product	: Alloy, Typical Laser DMLM Powder Particle Size Distribution covered: lower limit: 0/5/10/15 to upper limit: 45/53/63 microns
Product group	: Metal Alloy powders

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

1.2.1. Relevant identified uses

Main use category	: Industrial use
Use of the substance/mixture	: Raw material for 3D-printing and Powder Metallurgy Uses (HIP, MIM Additive Manufacturing). For Industrial, Research & Development (R&D) or Laboratory Use Only (Reserve Only to Trained personnel).
Function or use category	: 55/999 Others

1.2.2. Uses advised against

Restrictions on use	: Other uses than the identified uses indicated above.
---------------------	--

1.3. Details of the supplier of the safety data sheet

Supplier

GE Additive / AP&C Advanced Powders and Coatings Inc.
3765 La Vérendrye, suite 110
CA- J7H 1R8 Boisbriand, Québec
Canada
T +1 450.434.1004
GEAdd.SDS@ge.com - www.advancedpowders.com

Distributor

GE Additive / Arcam AB
Designvägen, 2
SE- 435 33 Mölnlycke
Sweden
T +46 (0)31 710 32 00 - F +46 (0)31 710 32 01

Distributor

GE Additive / Concept Laser GmbH
An der Zeil, 8
DE- 96215 Lichtenfels
Germany
T +49 (0)9571 1679 0

1.4. Emergency telephone number

Emergency number	: For Chemical Emergency Call INFOTRAC (Canada additional: CANUTEC +1 613.996.6666) 24hr/day 7days/week Within USA and Canada: 1-800-535-5053 Outside USA and Canada: +1-352-323-3500 (collect calls accepted)
------------------	---

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Skin sensitisation, Category 1	H317
Carcinogenicity, Category 2	H351
Specific target organ toxicity – Repeated exposure, Category 1	H372
Full text of H- and EUH-statements: see section 16	

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

Adverse physicochemical, human health and environmental effects

May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause long lasting harmful effects to aquatic life. Suspected of causing cancer. Causes damage to organs through prolonged or repeated exposure. May cause an allergic skin reaction.

2.2. Label elements

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

Hazard pictograms (CLP)



GHS07

GHS08

Signal word (CLP)

: Danger

Contains

: nickel, powder, particle diameter < 1 mm

Hazard statements (CLP)

: H317 - May cause an allergic skin reaction.

H351 - Suspected of causing cancer.

H372 - Causes damage to organs through prolonged or repeated exposure.

Precautionary statements (CLP)

: P280 - Wear protective clothing, eye protection, face protection, protective gloves.

P308+P313 - IF exposed or concerned: Get medical advice/attention.

P260 - Do not breathe dust/fume/gas/mist/vapours/spray.

P302+P352 - IF ON SKIN: Wash with plenty of water.

P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

Extra phrases

: Restricted to professional users.

For use in industrial installations only.

2.3. Other hazards

Other hazards which do not result in classification

: Potential dust explosion hazard. Dust may form explosive mixture in air. Dust clouds may form weak explosive mixtures with air. Handling and/or processing of this material may generate a dust which may form flammable or explosive mixture with air. Such dust can also cause mechanical irritation of the eyes, skin, nose and throat. May form potentially combustible dust concentrations when suspended in air or other oxidizing medium.

Contains no PBT/vPvB substances $\geq 0.1\%$ assessed in accordance with REACH Annex XIII

Component	
iron, powder (7439-89-6)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII
nickel, powder, particle diameter < 1 mm (7440-02-0)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII
chromium (7440-47-3)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII
manganese, powder (7439-96-5)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII
Sulfur (7704-34-9)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII
Phosphorous (7723-14-0)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, 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 %

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Comments : The powders declared herein are considered "mixtures" from a GHS SDS point of view, but are in reality "alloyed powders" (so not a "mixture" of different "elemental" powders). The GHS & SDS structure forces us to use such "mixture" categorization. See the Notes below the table for more details.

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
iron, powder	CAS-No.: 7439-89-6 EC-No.: 231-096-4 REACH-no: 01-2119462838-24	62.9 – 71.5	Flam. Sol. 2, H228
chromium substance with national workplace exposure limit(s) (AT, BE, BG, CZ, DE, DK, EE, ES, FI, FR, GB, GI, GR, HR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK, NO, CH); substance with a Community workplace exposure limit	CAS-No.: 7440-47-3 EC-No.: 231-157-5 REACH-no: 01-2119485652-31	16.5 – 18.5	Not classified
nickel, powder, particle diameter < 1 mm substance with national workplace exposure limit(s) (AT, BE, BG, CZ, DE, DK, EE, ES, FI, FR, GB, HR, HU, IE, LT, LV, PL, PT, SE, SI, CH); substance with a Community workplace exposure limit	CAS-No.: 7440-02-0 EC-No.: 231-111-4 EC Index-No.: 028-002-01-4 REACH-no: 01-2119438727-29-0174	10 – 13	Skin Sens. 1, H317 Carc. 2, H351 STOT RE 1, H372 Aquatic Chronic 3, H412 (M=1)
molybdenum substance with national workplace exposure limit(s) (AT, BE, BG, CZ, EE, ES, FI, GB, IE, LT, PL, PT, SE, SK, CH)	CAS-No.: 7439-98-7 EC-No.: 231-107-2 REACH-no: 01-2119472304-43	2 – 2.5	Not classified
manganese, powder substance with national workplace exposure limit(s) (AT, BE, CZ, DE, DK, EE, ES, FI, FR, GB, HR, HU, IE, LV, NL, PL, PT, SE, SI, SK, NO, CH); substance with a Community workplace exposure limit	CAS-No.: 7439-96-5 EC-No.: 231-105-1	0 – 2	Flam. Sol. 1, H228
silicon, powder, amorphous substance with national workplace exposure limit(s) (BE, DK, EE, FR, GB, GR, HR, IE, SK, NO, CH)	CAS-No.: 7440-21-3 EC-No.: 231-130-8 REACH-no: 01-2119480401-47	0 – 1	Flam. Sol. 2, H228
Phosphorous substance with national workplace exposure limit(s) (AT, BE, EE, GB, GR, HR, HU, IE, LV, RO, NO, CH)	CAS-No.: 7723-14-0 EC-No.: 231-768-7 EC Index-No.: 015-002-00-7	0 – 0.045	Flam. Sol. 1, H228 Aquatic Chronic 3, H412
Carbon (C) substance with national workplace exposure limit(s) (AT, GB, PL)	CAS-No.: 7440-44-0 EC-No.: 231-153-3	≤ 0.03	Acute Tox. 4 (Oral), H302 (ATE=500 mg/kg bodyweight)
Sulfur substance with national workplace exposure limit(s) (LT, LV, RO)	CAS-No.: 7704-34-9 EC-No.: 231-722-6 EC Index-No.: 016-094-00-1	≤ 0.03	Skin Irrit. 2, H315

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

Comments : The substances identified as "constituents" are chemical compounds that are typically present in the UVCB substance. Their presence may be relevant for hazard classification, or other health / environmental reasons (i.e. OELs)

The substances identified above and forming the mixture are all purposely selected to be in powder form, when available. The Table is primarily indicative of individual elements identification, classification and % in the alloyed powders. The final products are classified in the SDS, section 2. Per our metal powder SDS authoring process, we always use the powder form of a given chemical element in sect. 3, when it is available from our recognized external chemical database. This is to ensure all risk inherent to the powder form of any substance is taken into account as a baseline. Only scientific evidence and/or test data can in the end determine the final product classification and "declassify" it, if applicable. This process assures a maximum safety level for all users.

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 : IF exposed or concerned: Get medical advice/attention. Call a poison center or a doctor if you feel unwell.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a poison center or a doctor.

First-aid measures after skin contact : Wash skin with plenty of water. Take off contaminated clothing. If skin irritation or rash occurs: Get medical advice/attention.

First-aid measures after eye contact : Rinse eyes with water as a precaution.

First-aid measures after ingestion : Call a poison center or a doctor if you feel unwell.

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

Symptoms/effects : May cause damage to organs through prolonged or repeated exposure. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause respiratory irritation.

Symptoms/effects after inhalation : May cause allergy or asthma symptoms or breathing difficulties if inhaled. Dust of the product, if present, may cause respiratory irritation after an excessive inhalation exposure. Inhalation may cause irritation (cough, short breathing, difficulty in breathing).

Symptoms/effects after skin contact : May cause an allergic skin reaction.

Symptoms/effects after eye contact : May cause eye irritation. Dust from this product may cause eye irritation.

Symptoms/effects after ingestion : May cause irritation to the digestive tract.

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

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Dry Sand, Class D extinguisher, Limestone, Unpressurized Water with local Safety Office/Fire Department approved metal fire additive (e.g. surfactants)

Use fire extinguishing methods suitable to surrounding conditions. Dry Sand, Class D extinguisher, Limestone, Unpressurized Water with local Safety Office/Fire Department approved metal fire additive (e.g. surfactants)

Use fire extinguishing methods suitable to surrounding conditions.

Unsuitable extinguishing media : Any media not listed as suitable (above) and/or not approved by local authorities.).

Water (without local Safety Office/Fire Department approved additive). Any media not listed as suitable (above) and/or not approved by local authorities.).

Water (without local Safety Office/Fire Department approved additive).

5.2. Special hazards arising from the substance or mixture

Fire hazard : May form combustible dust concentrations in air. In finely divided state: increased fire hazard. In case of fire and/or explosion do not breathe fumes.

Explosion hazard : Risk of dust explosion.

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

Hazardous decomposition products in case of fire : Toxic fumes may be released.

5.3. Advice for firefighters

- Precautionary measures fire : Minimize generation of dust which may be combustible. Keep container tightly closed and away from heat, sparks and flame. This product is not to be used under conditions of poor ventilation.
- Firefighting instructions : Do not enter fire area without proper protective equipment, including respiratory protection. Eliminate all ignition sources if safe to do so. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion. Take account of environmentally hazardous firefighting water. Prevent fire fighting water from entering the environment.
- Protection during firefighting : Self-contained breathing apparatus. Do not attempt to take action without suitable protective equipment. Complete protective clothing. Wear appropriate protective equipment and self-contained breathing apparatus (SBCA).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Avoid generating dust. Avoid breathing dust. Eliminate every possible source of ignition. No open flames. No smoking. Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment.

6.1.1. For non-emergency personnel

Emergency procedures : Ventilate spillage area. Do not breathe dust/fume/gas/mist/vapours/spray. Avoid contact with skin and eyes. Avoid contact with skin, eyes and clothing. Do not touch or walk on the spilled product. Only qualified personnel equipped with suitable protective equipment may intervene. See section 8 of the SDS for more information on personal protective equipment.

6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Avoid release to the environment. Prevent entry to sewers and public waters. Do not allow to enter drains or water courses.

6.3. Methods and material for containment and cleaning up

- For containment : Powdered form: no compressed air for pumping over spills. Collect spillage. Do not touch or walk on the spilled product. Do not use compressed air for pumping over spills. Do not push powder long distances across the floor. Keep in small piles away from each other.
- Methods for cleaning up : Mechanically recover the product. Notify authorities if product enters sewers or public waters.
- Other information : Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 13. For further information refer to section 8: "Exposure controls/personal protection".

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Dust may form flammable and explosive mixture with air. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

Precautions for safe handling	: Ensure good ventilation of the work station. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear personal protective equipment. Do not breathe dust/fume/gas/mist/vapours/spray. Avoid contact with skin and eyes. Maintain a supply of "coarse" (rock-type) salt and/or "Class D" (for metal fires) fire extinguisher located near processing and storage areas. Keep work areas clean and free of waste. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ground/bond container and receiving equipment. Limit quantities of product at the minimum necessary for handling and limit the number of exposed workers. Floors, walls and other surfaces in the hazard area must be cleaned regularly. Provide local exhaust or general room ventilation to minimize exposure to dust. Do not breathe dust/fume/gas/mist/vapours/spray. When plastic liners are present in pails and are the primary powder barrier bag, it is not recommended to handle powder only in those liners. The powder should at all times be handled within their liners & pails (as shipped/received). This to prevent powder leaks and safely carry the powder (in case of damaged bag during transport, etc.).
Hygiene measures	: Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product. Separate working clothes from town clothes. Launder separately. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	: Store in tightly closed, leak-proof containers. Comply with applicable regulations. Keep in a cool, well-ventilated place away from heat. Store in a well-ventilated place. Keep container tightly closed. Ensure adequate ventilation, especially in confined areas. Ground/bond container and receiving equipment. Maintain air gap between stacks/pallets.
Storage conditions	: Store locked up. Keep cool. Protect from sunlight. Keep away from ignition sources. Store away from other materials. Store in a well-ventilated place.
Incompatible products	: Oxidizing agent. Strong acids. Strong bases.
Incompatible materials	: combustible materials. Heat sources. Sources of ignition.
Heat and ignition sources	: KEEP SUBSTANCE AWAY FROM: heat sources. ignition sources.
Information on mixed storage	: KEEP SUBSTANCE AWAY FROM: oxidizing agents. combustible materials. (strong) acids. (strong) bases. moisture.
Storage area	: Store away from heat.
Packaging materials	: Keep only in the original container in a cool, well-ventilated place away from combustible materials.

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

nickel, powder, particle diameter < 1 mm (7440-02-0)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Nickel metal
IOEL TWA	0.005 mg/m ³ (respirable fraction)
Remark	(Year of adoption 2011)
Regulatory reference	SCOEL Recommendations
EU - Biological Limit Value (BLV)	
Local name	Nickel and nickel compounds
Regulatory reference	SCOEL List of recommended health-based BLVs and BGVs

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

nickel, powder, particle diameter < 1 mm (7440-02-0)	
Austria - Occupational Exposure Limits	
Local name	Nickel (Stäube von Nickelmetall, Nickelsulfid und sulfidischen Erzen, Nickeloxide und Nickelcarbonat) und Stäube von Nickelverbindungen und Nickellegierungen
TRK (OEL TWA)	0.5 mg/m ³ (als Ni berechnet, E)
TRK (OEL STEL)	2 mg/m ³ (als Ni berechnet, E, 4x 15(Miw) min)
Remark	Sah. Krebs erzeugend: III A1
Regulatory reference	BGBl. II Nr. 156/2021
Austria - Biological limit values	
Local name	Nickel
BLV	7 µg/l Parameter: Nickel - Untersuchungsmaterial: Harn
Remark	Eignung mit vorzeitiger Folgeuntersuchung: Bei Überschreiten des Grenzwertes für Nickel im Harn. Bei Vorliegen einer wesentlichen Beeinträchtigung der Lungenfunktion. Diese ist anzunehmen, wenn nach mehrmaliger Messung der beste gemessene Wert den für den/die Untersuchte/n maßgebenden Sollwert um 20% unterschreitet, bzw. den MEF50-Sollwert um 50% unterschreitet. Eine vorzeitige Folgeuntersuchung ist jedoch nicht erforderlich, wenn im Vergleich zu Vorbefunden der altersabhängige physiologische Abfall der 1 Sekundenkapazität (FEV1) von 40 ml/Jahr nicht überschritten wird oder aus der Beurteilung des Kurvenverlaufes der Forcierten Vitalkapazität (FVC) eine eingeschränkte Mitarbeit des Untersuchten/der Untersuchten ersichtlich ist. Der Zeitabstand zwischen den Untersuchungen beträgt bei Eignung: ein Jahr; bei Eignung mit vorzeitiger Folgeuntersuchung: sechs Monate.
Regulatory reference	Verordnung über die Gesundheitsüberwachung am Arbeitsplatz 2017 (VGÜ 2017)
Belgium - Occupational Exposure Limits	
Local name	Nickel (métal) # Nikkel (metaal)
OEL TWA	1 mg/m ³
Regulatory reference	Koninklijk besluit/Arrêté royal 11/05/2021
Bulgaria - Occupational Exposure Limits	
Local name	Никел
OEL TWA	0.05 mg/m ³ (метал и съединения (като никел))
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 47 от 2021 г., в сила от 04.06.2021 г.)
Bulgaria - Biological limit values	
Local name	Никел метал, разтворими съединения, никелов сулфат, никелов хром-фосфат (като никел)
BLV	45 µg/l Биомаркер за експозиция/биомаркер за ефект: никел - Биологична среда: урина - Време на пробовземане: След няколко работни смени - Специфични ефекти: Няма
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 47 от 2021 г., в сила от 04.06.2021 г.)
Croatia - Occupational Exposure Limits	
Local name	Nikal
GVI (OEL TWA) [1]	0.5 mg/m ³
Remark	Alergen koža (tvar koja može izazvati alergijsku reakciju na koži (H317))

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

nickel, powder, particle diameter < 1 mm (7440-02-0)	
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 1/2021)
Croatia - Biological limit values	
Local name	Nikal (topljivi spojevi)
BLV	0.17 µmol/l Karakteristični pokazatelj: nikal - Biološki uzorak: plazma - Vrijeme uzorkovanja: na kraju radne smjene 10 µg/l Karakteristični pokazatelj: nikal - Biološki uzorak: plazma - Vrijeme uzorkovanja: na kraju radne smjene 15.4 µmol/mol creatinine Karakteristični pokazatelj: nikal - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene 8 µg/g creatinine Karakteristični pokazatelj: nikal - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 91/2018)
Czech Republic - Occupational Exposure Limits	
Local name	Nikl
PEL (OEL TWA)	0.5 mg/m ³
NPK-P (OEL C)	1 mg/m ³
Remark	B - u látky je zaveden biologický expoziční test (BET) v moči nebo krvi, S - látka má senzibilizující účinek (s větou H317, H334), V - vdechovatelná frakce aerosolu.
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 195/2021 Sb.)
Czech Republic - Biological limit values	
Local name	Nikl
BLV	0.04 mg/g creatinine Ukazatel: Nikl - Biologický vzorek: moči - Doba odběru: nerozhoduje 0.077 µmol/mmol Creatinine Ukazatel: Nikl - Biologický vzorek: moči - Doba odběru: nerozhoduje
Regulatory reference	Vyhláška č. 107/2013 Sb. (kterou se mění vyhláška č. 432/2003 Sb.)
Denmark - Occupational Exposure Limits	
Local name	Nikkel, pulver og støv
OEL TWA [1]	0.05 mg/m ³ beregnet som Ni
Remark	K (betyder, at stoffet anses for at kunne være kræftfremkaldende)
Regulatory reference	BEK nr 1054 af 28/06/2022
Estonia - Occupational Exposure Limits	
Local name	Nikkel, metall
OEL TWA	0.5 mg/m ³
Remark	S (Sensibiliseeriv aine)
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 15.05.2021, 1)
Finland - Occupational Exposure Limits	
Local name	Nikkeli, metalli
HTP (OEL TWA) [1]	0.01 mg/m ³ Ni, alveolijae
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveystieteiden ministeriö)
Finland - Biological limit values	
Local name	Nikkeli, metalli

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

nickel, powder, particle diameter < 1 mm (7440-02-0)	
BLV	0.1 µmol/l Parametri: Virtsan nikkeli - Näytteenottoajankohta: Työvuoron päätyttyä työviikon tai altistumisjakson loputtua
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
Local name	Nickel (métal)
VME (OEL TWA)	1 mg/m ³
Remark	Valeurs recommandées/admises; substance classée cancérogène de catégorie 2
Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 984, 2016)
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	Nickel und Nickelverbindungen
AGW (OEL TWA) [1]	0.03 mg/m ³ (E)
Peak exposure limitation factor	8(II)
Remark	AGS - Ausschuss für Gefahrstoffe; Sh - Hautsensibilisierender Stoff; Y - Ein Risiko der Fruchtschädigung braucht bei Einhaltung des Arbeitsplatzgrenzwertes und des biologischen Grenzwertes (BGW) nicht befürchtet zu werden; 10 - Der Arbeitsplatzgrenzwert bezieht sich auf den Elementgehalt des entsprechenden Metalls; 24 - Für als Carc 1A oder 1B eingestufte Nickelverbindungen siehe TRGS 910 und TRGS 561. Eine Beurteilung anhand des AGW für Nickelmetall kann dann erfolgen, wenn ausschließlich Nickelmetall vorliegt. Sofern bei Tätigkeiten nickelhaltige Stäube entstehen, bei denen nur eine Oberflächenoxidation zu unterstellen ist, sind diese wie nickelmetallhaltige Gemische zu behandeln. Bei Anwendung von thermischen Verfahren in Gegenwart von Luftsauerstoff ist grundsätzlich eine Bildung von oxidischen Nickelverbindungen anzunehmen. Dies ist beispielsweise beim Schweißen (Elektroden oder Draht) und thermischen Schneiden mit bzw. von Legierungen, beim Metallspritzen von Legierungen, beim Schmelzen und Gießen von Legierungen und beim Schleifen und Trennen von Legierungen mit "Funkenbildung" der Fall. Weitere Empfehlungen sowie Beispiele für Arbeitsverfahren, bei denen der AGW bzw. die ERB zur Beurteilung herangezogen werden können, enthält die IFA-Arbeitsmappe (Kennzahl 0537); 31 - Die arbeitsmedizinisch-toxikologische Ableitung des Wertes basiert auf einer Plausibilitätsbetrachtung. Auf die Werte für den A-Staub für Nickelmetall in dieser TRGS und für Nickelverbindungen in der TRGS 910 wird hingewiesen
Regulatory reference	TRGS900
Hungary - Biological Exposure Indices	
Local name	Nikkel
BEI	0.003 mg/l Biológiai expozíciós (hatás) mutató: nikkeli - Biológiai minta: vizeletben - Mintavétel ideje: mhv., m.v. (munkahét végén, műszak végén) 0.051 µmol/l Biológiai expozíciós (hatás) mutató: nikkeli - Biológiai minta: vizeletben - Mintavétel ideje: mhv., m.v. (munkahét végén, műszak végén)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Ireland - Occupational Exposure Limits	
Local name	Nickel
OEL TWA [1]	0.5 mg/m ³

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

nickel, powder, particle diameter < 1 mm (7440-02-0)	
Remark	Sens. (In the workplace respiratory or dermal exposures to sensitising agents may occur. Sensitizers may evoke respiratory or dermal reactions, e.g. asthma, rhinitis and allergic contact dermatitis. The notation does not distinguish between respiratory or dermal sensitisation. Chemical agents that are sensitizers present special problems in the workplace. Should an employee become sensitised, subsequent exposure may cause intense responses, even at low exposure concentrations well below the OELV. Exposure should be eliminated or significantly reduced through control measures such as engineering and process controls and use of personal protective equipment (PPE))
Regulatory reference	Chemical Agents Code of Practice 2021
Ireland - Biological limit values	
Local name	Nickel
BMGV	3 µg/l Parameter: Ni - Medium: urine - Sampling time: After several consecutive working shifts
Regulatory reference	Biological Monitoring Guidelines (HSA, 2011)
Latvia - Occupational Exposure Limits	
Local name	Niķelis, niķeļa oksīdi, sulfīdi un savienojumu maisījumi (pēc Ni)
OEL TWA	0.05 mg/m ³
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2011. gada 1. februārī noteikumiem Nr. 92)
Latvia - Biological Exposure Indices	
Local name	Niķelim un tā neorganiskajiem savienojumiem
BEI	3 µg/l Niķelim urīnā
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2021. gada 18. februārī noteikumiem Nr. 110)
Lithuania - Occupational Exposure Limits	
Local name	Nikelis
IPRV (OEL TWA)	0.5 mg/m ³
Remark	K (kancerogeninis poveikis); J (jautrinantis poveikis)
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Poland - Occupational Exposure Limits	
Local name	Nikiel i jego związki, z wyjątkiem tetrakarbonylku niklu (niklu karbonylku)
NDS (OEL TWA)	0.25 mg/m ³ w przeliczeniu na Ni
Regulatory reference	Dz. U. 2018 poz. 1286
Portugal - Occupational Exposure Limits	
Local name	Níquel, expresso em Ni Elementar
OEL TWA	1.5 mg/m ³ I (Fração inalável)
Remark	A5 (Agente não suspeito de ser carcinogénico no Homem)
Regulatory reference	Norma Portuguesa NP 1796:2014
Slovenia - Occupational Exposure Limits	
Local name	nikelj – kovina
OEL TWA	0.006 mg/m ³
OEL STEL	0.048 mg/m ³

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

nickel, powder, particle diameter < 1 mm (7440-02-0)	
Remark	Y (Snovi, pri katerih ni nevarnosti za zarodek ob upoštevanju mejnih vrednosti in bat vrednosti), EKA (Zveza med koncentracijo rakotvornih snovi v zraku na delovnem mestu in količino snovi in/ali njenih metabolitov v organizmu)
Regulatory reference	Uradni list RS, št. 72/2021 z dne 11.5.2021
Spain - Occupational Exposure Limits	
Local name	Níquel metal
VLA-ED (OEL TWA) [1]	1 mg/m ³
Remark	Sen (Sensibilizante), r (Esta sustancia tiene establecidas restricciones a la fabricación, la comercialización o el uso en los términos especificados en el "Reglamento (CE) nº 1907/2006 sobre Registro, Evaluación, Autorización y Restricción de sustancias y preparados químicos" (REACH) de 18 de diciembre de 2006 (DOUE L 369 de 30 de diciembre de 2006). Las restricciones de una sustancia pueden aplicarse a todos los usos o sólo a usos concretos. El anexo XVII del Reglamento REACH contiene la lista de todas las sustancias restringidas y especifica los usos que se han restringido).
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2022. INSHT
Sweden - Occupational Exposure Limits	
Local name	Nickel, metall
NGV (OEL TWA)	0.5 mg/m ³ totaldamm
Remark	S (Ämnet är sensibiliserande. Sensibiliserande ämnen kan ge allergi eller annan överkänslighet. Överkänslighetsbesvären drabbar främst huden eller andningsorganen. Överkänslighet innebär att man reagerar vid kontakt med ämnen som normalt inte ger besvär. Allergi är en undergrupp av överkänslighet som orsakas av reaktioner i kroppens immunsystem. Särskilt låga gränsvärden har fastställts för ämnen med mer uttalat luftvägssensibiliserande egenskaper. Några ämnen med starkt sensibiliserande egenskaper får endast hanteras efter tillstånd från Arbetsmiljöverket, se föreskrifterna om kemiska arbetsmiljörisker. Dessa ämnen har inga gränsvärden men i vissa fall riktvärden); 3 (Med totaldamm menas de partiklar (aerosoler) som fastnar på ett filter i den provtagare som beskrivs i Metodserien, Provtagning av totaldamm och respirabelt damm, Metod nr 1010, Arbetarskyddsstyrelsen, numera Arbetsmiljöverket. Filterdiametern är normalt 37 mm, men kan även vara 25 mm. Trots sitt namn provtas inte den totala mängden luftburna partiklar med denna metod)
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
United Kingdom - Occupational Exposure Limits	
Local name	Nickel
WEL TWA (OEL TWA) [1]	0.5 mg/m ³
Remark	Sk (Can be absorbed through the skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity), Carc (Capable of causing cancer and/or heritable genetic damage (nickel oxides and sulphides)), Sen (Capable of causing occupational asthma (nickel sulphate))
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Switzerland - Occupational Exposure Limits	
Local name	Nickel, métal / Nickel, Metall
MAK (OEL TWA) [1]	0.5 mg/m ³ (i) / (e)
Critical toxicity	Peau, Fibpulm / Haut, Lungenfibrose
Notation	S, C2, B / S, C2, B
Remark	HSE, NIOSH, BG
Regulatory reference	www.suva.ch, 28.03.2022

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

nickel, powder, particle diameter < 1 mm (7440-02-0)	
Switzerland - BAT	
Local name	Nickel, métal / Nickel, Metall
BAT	45 µg/l (766.6 nmol/l; Paramètre biologique: Nickel; Substrat d'examen: Urine; Moment du prélèvement: Fin de l'exposition, de la période de travail. Exposition de longue durée: après plusieurs périodes de travail.) / (766.6 nmol/l; Biologischer Parameter: Nickel; Untersuchungsmaterial: Urin; Probennahmezeitpunkt: Expositionsende, bzw. Schichtende. Bei Langzeitexposition: nach mehreren vorangegangenen Schichten.)
Remark	Paramètre non spécifique. / Nicht spezifischer Parameter.
Regulatory reference	Ordonnance 832.30 (OPA), article 50 al. 3, www.suva.ch/valeurs-limites / Verordnung 832.30 (VUV), Art. 50 Abs. 3, www.suva.ch/grenzwerte
USA - ACGIH - Occupational Exposure Limits	
Local name	Nickel, elemental
ACGIH OEL TWA	1.5 mg/m ³ (Inhalable fraction)
Remark (ACGIH)	TLV® Basis: Dermatitis; pneumoconiosis. Notations: A5 (Not Suspected as a Human Carcinogen)
Regulatory reference	ACGIH 2022
USA - ACGIH - Biological Exposure Indices	
Local name	NICKEL AND INORGANIC COMPOUNDS
BEI	5 µg/l Parameter: Nickel - Medium: urine after exposure to elemental Nickel and poorly soluble compounds - Sampling time: Post-shift at end of workweek - Notations: B 30 µg/l Parameter: Nickel - Medium: urine after exposure to soluble compounds - Sampling time: Post-shift at end of workweek - Notations: B
Regulatory reference	ACGIH 2022
chromium (7440-47-3)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Chromium metal
IOEL TWA	2 mg/m ³
Regulatory reference	COMMISSION DIRECTIVE 2006/15/EC
Austria - Occupational Exposure Limits	
Local name	Chrommetall, anorganische Chrom(II)- und anorganische Chrom(III)-Verbindungen (unlöslich)
MAK (OEL TWA)	2 mg/m ³
Remark	Sh (für Cr(III)-Verbindungen)
Regulatory reference	BGBl. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
Local name	Chrome métal et composés inorganiques (à l'exception des composés Cr VI) # Chroom (metaal) en anorganische verbindingen (met uitzondering van Cr VI verbindingen)
OEL TWA	0.5 mg/m ³
Regulatory reference	Koninklijk besluit/Arrêté royal 11/05/2021
Bulgaria - Occupational Exposure Limits	
OEL TWA	2 mg/m ³
Croatia - Occupational Exposure Limits	
Local name	Krom, metal (kao Cr)

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

chromium (7440-47-3)	
GVI (OEL TWA) [1]	2 mg/m ³
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 1/2021)
Croatia - Biological limit values	
Local name	Krom (VI) topljivi spojevi
BLV	10 µmol/mol creatinine Karakteristični pokazatelj: krom - Biološki uzorak: mokraća - Vrijeme uzorkovanja: jednokratni uzorak na kraju smjene 5 µg/g creatinine Karakteristični pokazatelj: krom - Biološki uzorak: mokraća - Vrijeme uzorkovanja: jednokratni uzorak na kraju smjene
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 91/2018)
Czech Republic - Occupational Exposure Limits	
Local name	Prach z chromu
PEL (OEL TWA)	0.5 mg/m ³ (dust)
Remark	Prachy s převážně dráždivým účinkem.
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 195/2021 Sb.)
Denmark - Occupational Exposure Limits	
Local name	Chrom, pulver og opløselige chromi- og chromosalte
OEL TWA [1]	0.5 mg/m ³ (Grænseværdie (langvarig), powder)
Remark	E (betyder, at stoffet har en EF-grænseværdi)
Regulatory reference	BEK nr 1054 af 28/06/2022
Estonia - Occupational Exposure Limits	
Local name	Kroom (metall) ja tema anorgaanilised ühendid, v.akroomhape ja kromaadid (arvutatud kroomile)
OEL TWA	2 mg/m ³
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 15.05.2021, 1)
Finland - Occupational Exposure Limits	
Local name	Kromi, metalli
HTP (OEL TWA) [1]	0.005 mg/m ³ (arvo-8h)
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
Finland - Biological limit values	
Local name	Kromi-(VI) ja sen yhdisteet
BLV	0.2 µmol/l Parametri: Virtsan kromi - Näytteenottoajankohta: Työvaiheen tai työvuoron päätyttyä työviikon tai altistumisjakson loputtua
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
Local name	Chrome (métal), composés de chrome inorganiques (II) et composés de chrome inorganiques (insolubles) (III)
VME (OEL TWA)	2 mg/m ³
Remark	Valeurs réglementaires indicatives
Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 984, 2016)

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

chromium (7440-47-3)	
France - Biological limit values	
BLV	0.01 mg/g creatinine (BEI, Medium: urine -Time: augmented during shift -Parameter: Total Chromium (Background noise on non-exposed subjects (soluble aerosol)) 0.03 mg/g creatinine (BEI, (Medium: urine -Time: end of shift at end of workweek -Parameter: Total Chromium (Background noise on non-exposed subjects (soluble aerosol))
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	Chrom und anorganische Chrom(II) und (III)-Verbindungen
AGW (OEL TWA) [1]	2 mg/m ³ (E)
Peak exposure limitation factor	1(I)
Remark	EU - Europäische Union (Von der EU wurde ein Luftgrenzwert festgelegt: Abweichungen bei Wert und Spitzenbegrenzung sind möglich); 10 - Der Arbeitsplatzgrenzwert bezieht sich auf den Elementgehalt des entsprechenden Metalls
Regulatory reference	TRGS900
Greece - Occupational Exposure Limits	
Local name	Χρώμιο (μεταλλικό)
OEL TWA	1 mg/m ³
Regulatory reference	Π.Δ. 90/1999 - Προστασία της υγείας των εργαζομένων που εκτίθενται σε ορισμένους χημικούς παράγοντες κατά τη διάρκεια της εργασίας τους
Hungary - Occupational Exposure Limits	
Local name	KRÓM (fém), SZERVETLEN KRÓM (II) és KRÓM (III) VEGYÜLETEK (nem oldható)
AK (OEL TWA)	2 mg/m ³
Remark	i (ingerlő anyag, amely izgatja a bőrt, nyálkahártyát, szemet vagy mindhármát), sz (Túlérzékenységet okozó (szenzibilizáló) tulajdonságú anyag. Az anyagra érzékeny egyéneken „túlérzékenységen” alapuló bőr-, légzőrendszeri, esetleg más szervet/szervrendszert károsító megbetegedést okozhat), BEM (biológiai expozíciós mutató); EU2 (2006/15/EK irányelvben közölt érték); T (Azok az anyagok, amelyek egészségkárosító hatása TARTÓS expozíciót követően jelentkezik)
OEL chemical category	Sensitizer
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Hungary - Biological Exposure Indices	
Local name	Króm
BEI	0.01 mg/g creatinine Biológiai expozíciós (hatás) mutató: króm - Biológiai minta: vizeletben - Mintavétel ideje: m.v. (műszak végén) 0.022 μmol/mmol Creatinine Biológiai expozíciós (hatás) mutató: króm - Biológiai minta: vizeletben - Mintavétel ideje: m.v. (műszak végén)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Ireland - Occupational Exposure Limits	
Local name	Chromium metal
OEL TWA [1]	2 mg/m ³ (8h ref)
OEL STEL	6 mg/m ³ (calculated, 15 min ref)
Remark	IOELV (Indicative Occupational Exposure Limit Values)
Regulatory reference	Chemical Agents Code of Practice 2021

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

chromium (7440-47-3)	
Ireland - Biological limit values	
Local name	Chromium VI and water soluble compounds
BMGV	25 µg/l Parameter: total chromium - Medium: urine - Sampling time: End of shift at end of workweek - Notations: B (Background) 10 µg/l Parameter: total chromium - Medium: urine - Sampling time: Increase during shift
Regulatory reference	Biological Monitoring Guidelines (HSA, 2011)
Italy - Occupational Exposure Limits	
OEL TWA	0.5 mg/m ³
Latvia - Occupational Exposure Limits	
OEL TWA	2 mg/m ³ (Medium: urine -Time: change of shift -Parameter: Chromium (reference value for total Chromium concentration for occupationally unexposed population in blood <0.5µg/L, and in urine 0.5 g/L)
Latvia - Biological Exposure Indices	
BEI	10 µg/g creatinine
Lithuania - Occupational Exposure Limits	
IPRV (OEL TWA)	2 mg/m ³
Luxembourg - Occupational Exposure Limits	
OEL TWA	2 mg/m ³
Malta - Occupational Exposure Limits	
OEL TWA	2 mg/m ³
Netherlands - Occupational Exposure Limits	
Local name	Chroom
TGG-8u (OEL TWA)	0.5 mg/m ³
TGG-8u (OEL TWA) [ppm]	0.23 ppm
Regulatory reference	Arbeidsomstandighedenregeling 2022
Poland - Occupational Exposure Limits	
Local name	Chrom metaliczny
NDS (OEL TWA)	0.5 mg/m ³
Regulatory reference	Dz. U. 2018 poz. 1286
Portugal - Occupational Exposure Limits	
Local name	Crómio metal e compostos de crómio (III), expressos em Cr
OEL TWA	2 mg/m ³ (Indicative limit value)
OEL chemical category	A4 - Not Classifiable as a Human Carcinogen
Remark	A4 (Agente não classificável como carcinogénico no Homem)
Regulatory reference	Norma Portuguesa NP 1796:2014
Romania - Occupational Exposure Limits	
OEL TWA	0.5 mg/m ³ (Metallurgy) 2 mg/m ³ (metal)
OEL chemical category	Carcinogen Metallurgy
Romania - Biological limit values	
BLV	10 µg/g creatinine

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

chromium (7440-47-3)	
Slovakia - Occupational Exposure Limits	
Local name	Chróm anorg. zlúč. chrómu (II) a (III) – nerozpustné (ako Cr)
NPHV (OEL TWA) [1]	2 mg/m ³
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (236/2020 Z. z.)
Slovenia - Occupational Exposure Limits	
Local name	krom – kovinski, anorganske kromove (II) spojine in anorganske kromove (III) spojine (netopne)
OEL TWA	2 mg/m ³
OEL STEL	2 mg/m ³
Remark	EU
Regulatory reference	Uradni list RS, št. 72/2021 z dne 11.5.2021
Spain - Occupational Exposure Limits	
Local name	Cromo metal
VLA-ED (OEL TWA) [1]	2 mg/m ³
Remark	VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo).
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2022. INSHT
Sweden - Occupational Exposure Limits	
Local name	Krom, och oorg. (II, III)-föreningar (som Cr)
NGV (OEL TWA)	0.5 mg/m ³ (total dust / totalt damm)
Remark	3 (Med totaldamm menas de partiklar (aerosoler) som fastnar på ett filter i den provtagare som beskrivs i Metodserien, Provtagning av totaldamm och respirabelt damm, Metod nr 1010, Arbetarskyddsstyrelsen, numera Arbetsmiljöverket. Filterdiametern är normalt 37 mm, men kan även vara 25 mm. Trots sitt namn provtas inte den totala mängden luftburna partiklar med denna metod)
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
United Kingdom - Occupational Exposure Limits	
Local name	Chromium
WEL TWA (OEL TWA) [1]	0.5 mg/m ³
WEL STEL (OEL STEL)	1.5 mg/m ³ (calculated)
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
United Kingdom - Biological limit values	
Local name	Chromium VI
BMGV	10 µmol/mol creatinine Parameter: chromium - Medium: urine - Sampling time: Post shift
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Norway - Occupational Exposure Limits	
Grenseverdi (OEL TWA) [1]	0.5 mg/m ³
Korttidsverdi (OEL STEL)	0.5 mg/m ³
Switzerland - Occupational Exposure Limits	
Local name	Chrome (métal) / Chrom (Metall)
MAK (OEL TWA) [1]	0.5 mg/m ³ (VME, inhalable dust)
Critical toxicity	VRS, Peau / OAW, Haut

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

chromium (7440-47-3)	
Notation	S / S
Remark	HSE, NIOSH
OEL chemical category	Sensitizer
Regulatory reference	www.suva.ch, 28.03.2022
Switzerland - BAT	
Local name	Chrome, composés hexavalents / Chrom(VI)-Verbindungen
BAT	11 µg/l (212 nmol/l; Paramètre biologique: Chrome; Substrat d'examen: Urine; Moment du prélèvement: Fin de l'exposition, de la période de travail.) / (212 nmol/l; Biologischer Parameter: Chrom; Untersuchungsmaterial: Urin; Probenahmezeitpunkt: Expositionsende, bzw. Schichtende.)
Remark	Influence de l'environnement. / Umwelteinflüsse.
Regulatory reference	Ordonnance 832.30 (OPA), article 50 al. 3, www.suva.ch/valeurs-limites / Verordnung 832.30 (VUV), Art. 50 Abs. 3, www.suva.ch/grenzwerte
USA - ACGIH - Occupational Exposure Limits	
Local name	Metallic chromium, as Cr(0)
ACGIH OEL TWA	0.5 mg/m ³ (Inhalable fraction)
Remark (ACGIH)	TLV® Basis: Resp tract irr
Regulatory reference	ACGIH 2022
USA - ACGIH - Biological Exposure Indices	
Local name	CHROMIUM
BEI	0.7 µg/l Parameter: Total chromium - Medium: urine - Sampling time: End of shift at end of workweek - Notations: Pop
Regulatory reference	ACGIH 2022
manganese, powder (7439-96-5)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Manganese
IOEL TWA	0.2 mg/m ³ (Inhalable fraction) 0.05 mg/m ³ (Respirable fraction)
Remark	(Year of adoption 2011)
Regulatory reference	SCOEL Recommendations
Austria - Occupational Exposure Limits	
Local name	Mangan und seine anorganischen Verbindungen: Mangan
MAK (OEL TWA)	0.2 mg/m ³ (als Mn berechnet, E) 0.05 mg/m ³ (als Mn berechnet, A)
MAK (OEL STEL)	1.6 mg/m ³ (als Mn berechnet, E, 4x 15(Miw) min) 0.16 mg/m ³ (als Mn berechnet, A, 4x 15(Miw) min)
Regulatory reference	BGBI. II Nr. 156/2021
Austria - Biological limit values	
Local name	Mangan
BLV	20 µg/l Parameter: Mangan - Untersuchungsmaterial: Blut

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

manganese, powder (7439-96-5)	
Remark	Eignung: Blut: nur bei Verdacht auf manganbedingte neurologische Symptomatik Eignung mit vorzeitiger Folgeuntersuchung: Bei Überschreiten des Grenzwertes für Mangan im Blut. Bei anhaltendem Husten oder Abfall des systolischen Blutdrucks. Bei Vorliegen einer wesentlichen Beeinträchtigung der Lungenfunktion. Diese liegt vor, wenn nach mehrmaliger Messung der beste gemessene Wert den für den/die Untersuchte/n maßgebenden Sollwert um 20% unterschreitet bzw. den MEF50-Sollwert um 50% unterschreitet. Eine vorzeitige Folgeuntersuchung ist jedoch nicht erforderlich, wenn im Vergleich zu Vorbefunden der altersabhängige physiologische Abfall der 1-Sekundenkapazität (FEV1) von 40 ml/Jahr nicht überschritten wird oder aus der Beurteilung des Kurvenverlaufes der Forcierten Vitalkapazität (FVC) eine eingeschränkte Mitarbeit des Untersuchten/der Untersuchten ersichtlich ist. Der Zeitabstand zwischen den Untersuchungen beträgt bei Eignung: ein Jahr; bei Eignung mit vorzeitiger Folgeuntersuchung: sechs Monate
Regulatory reference	Verordnung über die Gesundheitsüberwachung am Arbeitsplatz 2017 (VGÜ 2017)
Belgium - Occupational Exposure Limits	
Local name	Manganèse et ses composés (en Mn) # Mangaan, en -verbindingen (als Mn)
OEL TWA	0.2 mg/m ³ 0.05 mg/m ³
Regulatory reference	Koninklijk besluit/Arrêté royal 11/05/2021
Croatia - Occupational Exposure Limits	
Local name	Mangan i anorganski spojevi mangana (kao Mn)
GVI (OEL TWA) [1]	0.2 mg/m ³ U (ukupna prašina) 0.05 mg/m ³ R (respirabilna prašina)
Remark	Direktiva: 2017/164/EU
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, граничним vrijednostima izloženosti i biološkim граничним vrijednostima (NN 1/2021)
Czech Republic - Occupational Exposure Limits	
Local name	Mangan a jeho anorganické sloučeniny, jako Mn
PEL (OEL TWA)	0.2 mg/m ³ (V) 0.05 mg/m ³ (R)
NPK-P (OEL C)	0.4 mg/m ³ (V) 0.1 mg/m ³ (R)
Remark	V - vdechovatelná frakce aerosolu, R - respirabilní frakce aerosolu.
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 195/2021 Sb.)
Denmark - Occupational Exposure Limits	
Local name	Mangan, pulver, støv og uorganiske forbindelser
OEL TWA [1]	0.2 mg/m ³ inhalerbar, beregnet som Mn 0.05 mg/m ³ respirabel, beregnet som Mn
Remark	E (betyder, at stoffet har en EF-grænseværdi)
Regulatory reference	BEK nr 1054 af 28/06/2022
Estonia - Occupational Exposure Limits	
Local name	Mangaan ja anorgaanilised ühendid (arvutatud mangaanile)
OEL TWA	0.2 mg/m ³ kogu tolm 0.05 mg/m ³ peentolm
Remark	1 (Peentolm koosneb alla 2,5-mikromeetrise läbimõõduga osakestest, mis võivad jõuda koos sissehingatava õhuga kopsu alveoolidesse (respireeritav fraktsioon))

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

manganese, powder (7439-96-5)	
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 15.05.2021, 1)
Finland - Occupational Exposure Limits	
Local name	Mangaani, metalli
HTP (OEL TWA) [1]	0.02 mg/m ³ Mn, alveolijae
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
VME (OEL TWA)	0.05 mg/m ³ 0.2 mg/m ³
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	Mangan und seine anorganischen Verbindungen
AGW (OEL TWA) [1]	0.02 mg/m ³ (A) 0.2 mg/m ³ (E)
Peak exposure limitation factor	8(II)
Remark	DFG - Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission); Y - Ein Risiko der Fruchtschädigung braucht bei Einhaltung des Arbeitsplatzgrenzwertes und des biologischen Grenzwertes (BGW) nicht befürchtet zu werden; 10 - Der Arbeitsplatzgrenzwert bezieht sich auf den Elementgehalt des entsprechenden Metalls; 20 - Für Permanganate gilt Spitzenbegrenzung, Überschreitungsfaktor 1(II); EU - Europäische Union (Von der EU wurde ein Luftgrenzwert festgelegt: Abweichungen bei Wert und Spitzenbegrenzung sind möglich)
Regulatory reference	TRGS900
Hungary - Occupational Exposure Limits	
Local name	MANGÁN ÉS SZERVETLEN SÓI (Mn-ra számítva)
AK (OEL TWA)	0.2 mg/m ³ 0.05 mg/m ³ respirábilis frakció
Remark	EU4 (2017/164 EU irányelvben közölt érték); Por: T (Azok az anyagok, amelyek egészségkárosító hatása TARTÓS expozíciót követően jelentkezik), füst: R+T (Azok az anyagok, amelyek RÖVID és TARTÓS expozíciója is egészségkárosodást okoz)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Ireland - Occupational Exposure Limits	
Local name	Manganese, fume (as Mn)
OEL TWA [1]	0.2 mg/m ³ I (Inhalable Fraction) 0.02 mg/m ³ R (Respirable Fraction)
OEL STEL	3 mg/m ³
Regulatory reference	Chemical Agents Code of Practice 2021
Latvia - Occupational Exposure Limits	
Local name	Mangāns metināšanas aerosolos (kondensācijas aerosols)
OEL TWA	0.1 mg/m ³
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2011. gada 1. februārī noteikumiem Nr. 92)
Netherlands - Occupational Exposure Limits	
Local name	Mangaan en anorganische mangaan-verbindingen

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

manganese, powder (7439-96-5)	
TGG-8u (OEL TWA)	0.05 mg/m ³ (respirabel) 0.2 mg/m ³ (inhaleerbaar)
TGG-8u (OEL TWA) [ppm]	0.022 ppm 0.088 ppm
TGG-15min (OEL STEL)	0.05 mg/m ³ Respirabel (als mangaan)
Regulatory reference	Arbeidsomstandighedenregeling 2022
Poland - Occupational Exposure Limits	
Local name	Mangan i jego związki nieorganiczne
NDS (OEL TWA)	0.2 mg/m ³ w przeliczeniu na Mn: frakcja wdychalna 0.05 mg/m ³ w przeliczeniu na Mn: frakcja respirabilna
Remark	Frakcja wdychalna – frakcja aerozolu wnikająca przez nos i usta, która po zdeponowaniu w drogach oddechowych stwarza zagrożenie dla zdrowia. Frakcja respirabilna – frakcja aerozolu wnikająca do dróg oddechowych, która stwarza zagrożenie dla zdrowia po zdeponowaniu w obszarze wymiany gazowej.
Regulatory reference	Dz. U. 2018 poz. 1286
Portugal - Occupational Exposure Limits	
Local name	Manganês e compostos inorgânicos, expressos em Mn
OEL TWA	0.1 mg/m ³ I (Fração inalável) 0.02 mg/m ³ R (Fração respirável)
Remark	A4 (Agente não classificável como carcinogénico no Homem)
Regulatory reference	Norma Portuguesa NP 1796:2014
Slovakia - Occupational Exposure Limits	
Local name	Mangán a jeho anorganické zlúčeniny (ako mangán)
NPHV (OEL TWA) [1]	0.2 mg/m ³ inhalovateľná frakcia 0.05 mg/m ³ respirabilná frakcia
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (236/2020 Z. z.)
Slovenia - Occupational Exposure Limits	
Local name	mangan in anorganske manganove spojine (računano kot Mg)
OEL TWA	0.2 mg/m ³ 0.05 mg/m ³
OEL STEL	1.6 mg/m ³ 0.4 mg/m ³
Remark	Y (Snovi, pri katerih ni nevarnosti za zarodek ob upoštevanju mejnih vrednosti in bat vrednosti), EU
Regulatory reference	Uradni list RS, št. 72/2021 z dne 11.5.2021
Spain - Occupational Exposure Limits	
Local name	Manganeso elemental
VLA-ED (OEL TWA) [1]	0.2 mg/m ³ Fracción inhalable 0.05 mg/m ³ Fracción respirable
Remark	VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo), d (Véase UNE EN 481: Atmósferas en los puestos de trabajo. Definición de las fracciones por el tamaño de las partículas para la medición de aerosoles).
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2022. INSHT

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

manganese, powder (7439-96-5)	
Sweden - Occupational Exposure Limits	
Local name	Mangan, och oorg. föreningar (som Mn)
NGV (OEL TWA)	0.2 mg/m ³ inhalerbar fraktion 0.05 mg/m ³ respirabel fraktion
Remark	3 (Med inhalerbar fraktion menas den mängd partiklar, av totalmängden partiklar i luften, som man inandas genom näsa och mun. Den respirabla fraktionen är de inhalerbara partiklar som når längst ner i luftvägarna, till alveolerna i lungorna)
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
United Kingdom - Occupational Exposure Limits	
WEL TWA (OEL TWA) [1]	0.2 mg/m ³ 0.05 mg/m ³
Norway - Occupational Exposure Limits	
Local name	Mangan og uorganiske manganforb. (beregnet som Mn)
Grenseverdi (OEL TWA) [1]	0.2 mg/m ³ Inhalerbar fraksjon 0.05 mg/m ³ Respirabel fraksjon
Remark	E: EU har en veiledende grenseverdi og/eller anmerkning for stoffet; 9) Enkelte bedrifter innen smelteverkindustrien vil av teknisk-økonomiske årsaker ikke kunne overholde grenseverdiene. Det er disse bedriftenes ansvar å dokumentere et forsvarlig arbeidsmiljø. Det forutsettes at bedriften(e) har en plan for reduksjon av eksponering og at man kan vise lavere verdier over tid. Arbeidstilsynet, ansattrepresentanter og verneombud skal konsulteres og informeres om årlige planer og oppnådde resultater.
Regulatory reference	FOR-2021-06-28-2248
Switzerland - Occupational Exposure Limits	
Local name	Manganèse et ses composés inorg. / Mangan und seine anorganischen Verbindungen
MAK (OEL TWA) [1]	0.5 mg/m ³ (i) / (e)
Critical toxicity	SNC / ZNS
Notation	SS _C , B, P / SS _C , B, P
Remark	NIOSH
Regulatory reference	www.suva.ch, 28.03.2022
Switzerland - BAT	
Local name	Manganèse et ses composés inorg. / Mangan und seine anorganischen Verbindungen
BAT	20 µg/l (364 nmol/l; Paramètre biologique: Manganèse; Substrat d'examen: Sang complet; Moment du prélèvement: Fin de l'exposition, de la période de travail. Exposition de longue durée: après plusieurs périodes de travail.) / (364 nmol/l; Biologischer Parameter: Mangan; Untersuchungsmaterial: Vollblut; Probennahmezeitpunkt: Expositionsende, bzw. Schichtende. Bei Langzeitexposition: nach mehreren vorangegangenen Schichten.)
Remark	Interprétation quantitative difficile. / Quantitative Interpretation schwierig.
Regulatory reference	Ordonnance 832.30 (OPA), article 50 al. 3, www.suva.ch/valeurs-limites / Verordnung 832.30 (VUV), Art. 50 Abs. 3, www.suva.ch/grenzwerte
USA - ACGIH - Occupational Exposure Limits	
Local name	Manganese, elemental and inorganic compounds, as Mn
ACGIH OEL TWA	0.02 mg/m ³ (Respirable fraction) 0.1 mg/m ³ (Inhalable fraction)
Remark (ACGIH)	TLV® Basis: CNS impair. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH 2022

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

silicon, powder, amorphous (7440-21-3)	
Belgium - Occupational Exposure Limits	
Local name	Silicium # Silicium
OEL TWA	10 mg/m ³
Regulatory reference	Koninklijk besluit/Arrêté royal 11/05/2021
Croatia - Occupational Exposure Limits	
Local name	Silicij
GVI (OEL TWA) [1]	10 mg/m ³ U (ukupna prašina) 4 mg/m ³ R (respirabilna prašina)
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 1/2021)
Denmark - Occupational Exposure Limits	
Local name	Silicium
OEL TWA [1]	10 mg/m ³
Regulatory reference	BEK nr 1054 af 28/06/2022
Estonia - Occupational Exposure Limits	
Local name	Silikoon
OEL TWA	10 mg/m ³ 5 mg/m ³ peentolm
Remark	1 (Peentolm koosneb alla 2,5-mikromeetrise läbimõõduga osakestest, mis võivad jõuda koos sissehingatava õhuga kopsu alveoolidesse (respireeritav fraktsioon))
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 15.05.2021, 1)
France - Occupational Exposure Limits	
Local name	Silicium
VME (OEL TWA)	10 mg/m ³
Remark	Valeurs recommandées/admises
Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 984, 2016)
Greece - Occupational Exposure Limits	
Local name	Πυρίτιο
OEL TWA	10 mg/m ³ εισπν. 5 mg/m ³ αναπν.
Regulatory reference	Π.Δ. 90/1999 - Προστασία της υγείας των εργαζομένων που εκτίθενται σε ορισμένους χημικούς παράγοντες κατά τη διάρκεια της εργασίας τους
Ireland - Occupational Exposure Limits	
Local name	Silicon Si
OEL TWA [1]	10 mg/m ³ total inhalable dust 4 mg/m ³ respirable dust
Regulatory reference	Chemical Agents Code of Practice 2021
Slovakia - Occupational Exposure Limits	
Local name	Silikón
NPHV (OEL TWA) [1]	10 mg/m ³ inhalovateľná frakcia 4 mg/m ³ respirabilná frakcia
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (236/2020 Z. z.)

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

silicon, powder, amorphous (7440-21-3)	
United Kingdom - Occupational Exposure Limits	
Local name	Silicon
WEL TWA (OEL TWA) [1]	10 mg/m ³ 4 mg/m ³
Remark	WEL TWA: 10 mg/m ³ (inhalable aerosol); 4 mg/m ³ (respirable aerosol)
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Norway - Occupational Exposure Limits	
Local name	Silisium
Grenseverdi (OEL TWA) [1]	10 mg/m ³
Remark	1) Grenseverdien er fastsatt lik verdien for sjenerende støv.
Regulatory reference	FOR-2021-06-28-2248
Switzerland - Occupational Exposure Limits	
Local name	Silicium / Silicium
MAK (OEL TWA) [1]	3 mg/m ³ (a) / (a)
Remark	NIOSH
Regulatory reference	www.suva.ch, 28.03.2022
Carbon (C) (7440-44-0)	
Austria - Occupational Exposure Limits	
Local name	Graphit (Alveolarstaub mit < 1% Quarz)
MAK (OEL TWA)	5 mg/m ³ (A)
MAK (OEL STEL)	10 mg/m ³ (A, 2x 60(Miw) min)
Regulatory reference	BGBl. II Nr. 156/2021
Poland - Occupational Exposure Limits	
Local name	Grafit syntetyczny
NDS (OEL TWA)	6 mg/m ³ frakcja wdychalna
Remark	Frakcja wdychalna – frakcja aerozolu wnikaćca przez nos i usta, która po zdeponowaniu w drogach oddechowych stwarza zagrożenie dla zdrowia.
Regulatory reference	Dz. U. 2018 poz. 1286
United Kingdom - Occupational Exposure Limits	
Local name	Graphite
WEL TWA (OEL TWA) [1]	10 mg/m ³ inhalable dust 4 mg/m ³ respirable
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Sulfur (7704-34-9)	
Latvia - Occupational Exposure Limits	
Local name	Sērs
OEL TWA	6 mg/m ³
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325
Lithuania - Occupational Exposure Limits	
Local name	Siera

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

Sulfur (7704-34-9)	
IPRV (OEL TWA)	6 mg/m ³
Remark	F (fibrogeninis poveikis)
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Romania - Occupational Exposure Limits	
Local name	Sulf
OEL STEL	15 mg/m ³ (Pulberi)
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 53/2021)
molybdenum (7439-98-7)	
Austria - Occupational Exposure Limits	
Local name	Molybdän und Molybdänverbindungen, unlösliche
MAK (OEL TWA)	10 mg/m ³ (als Mo berechnet, E)
MAK (OEL STEL)	20 mg/m ³ (als Mo berechnet, E, 2x 60(Miw) min)
Regulatory reference	BGBI. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
Local name	Molybdène (en Mo) # Molybdeenverbindungen (als Mo)
OEL TWA	10 mg/m ³ (composés insolubles) # (onoplosbaar) 0.5 mg/m ³ (composés solubles) (fraction alvéolaire) # (oplosbaar) (inadembare fractie)
Regulatory reference	Koninklijk besluit/Arrêté royal 11/05/2021
Bulgaria - Occupational Exposure Limits	
Local name	Молибден
OEL TWA	10 mg/m ³ (и негови съединения (като молибден)) 5 mg/m ³ (разтворими съединения (като молибден))
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 47 от 2021 г., в сила от 04.06.2021 г.)
Czech Republic - Occupational Exposure Limits	
Local name	Molybden
PEL (OEL TWA)	5 mg/m ³
NPK-P (OEL C)	25 mg/m ³
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 195/2021 Sb.)
Estonia - Occupational Exposure Limits	
OEL TWA	10 mg/m ³ (total dust) 5 mg/m ³ (respirable dust)
Finland - Occupational Exposure Limits	
HTP (OEL TWA) [1]	0.5 mg/m ³ (arvo 8h)
Ireland - Occupational Exposure Limits	
Local name	Molybdenum compounds (as Mo)
OEL TWA [1]	0.5 mg/m ³ R (Respirable Fraction) 10 mg/m ³ soluble compounds, I (Inhalable Fraction) 3 mg/m ³ insoluble compounds, R (Respirable Fraction)
Regulatory reference	Chemical Agents Code of Practice 2021

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

molybdenum (7439-98-7)	
Lithuania - Occupational Exposure Limits	
IPRV (OEL TWA)	10 mg/m ³ (inhalable fraction) 5 mg/m ³ (respirable fraction)
Poland - Occupational Exposure Limits	
Local name	Molibden i jego związki
NDS (OEL TWA)	4 mg/m ³ w przeliczeniu na Mo
NDSCh (OEL STEL)	10 mg/m ³ w przeliczeniu na Mo
Regulatory reference	Dz. U. 2018 poz. 1286
Portugal - Occupational Exposure Limits	
Local name	Molibdénio
OEL TWA	0.5 mg/m ³ Compostos solúveis, expresso em Mo. R (Fração respirável) 10 mg/m ³ Metal e compostos insolúveis, expresso em Mo. I (Fração inalável) 3 mg/m ³ Metal e compostos insolúveis, expresso em Mo. R (Fração respirável)
Remark	Compostos solúveis: A3 (Agente carcinogénico confirmado nos animais de laboratório con relevância desconhecida no Homem)
Regulatory reference	Norma Portuguesa NP 1796:2014
Slovakia - Occupational Exposure Limits	
Local name	Molybdén
NPHV (OEL TWA) [1]	5 mg/m ³ a jeho zlúčeniny rozpustné (ako Mo) 10 mg/m ³ a jeho zlúčeniny nerozpustné (ako Mo) inhalovateľná frakcia 5 mg/m ³ a jeho zlúčeniny nerozpustné (ako Mo) respirabilná frakcia
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (236/2020 Z. z.)
Spain - Occupational Exposure Limits	
Local name	Molibdeno elemental
VLA-ED (OEL TWA) [1]	10 mg/m ³ Fracción inhalable 3 mg/m ³ Fracción respirable
Remark	d (Véase UNE EN 481: Atmósferas en los puestos de trabajo. Definición de las fracciones por el tamaño de las partículas para la medición de aerosoles).
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2022. INSHT
Sweden - Occupational Exposure Limits	
Local name	Molybden, metall och svårösliga. föreningar (som Mo)
NGV (OEL TWA)	10 mg/m ³ totaldamm 5 mg/m ³ respirabel fraktion
Remark	3 (Den respirabla fraktionen är de inhalerbara partiklar som når längst ner i luftvägarna, till alveolerna i lungorna. Med totaldamm menas de partiklar (aerosoler) som fastnar på ett filter i den provtagare som beskrivs i Metodserien, Provtagning av totaldamm och respirabelt damm, Metod nr 1010, Arbetarskyddsstyrelsen, numera Arbetsmiljöverket. Filterdiametern är normalt 37 mm, men kan även vara 25 mm. Trots sitt namn provtas inte den totala mängden luftburna partiklar med denna metod)
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
United Kingdom - Occupational Exposure Limits	
Local name	Molybdenum
WEL TWA (OEL TWA) [1]	10 mg/m ³ insoluble compounds (as Mo) 5 mg/m ³ soluble compounds (as Mo)

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

molybdenum (7439-98-7)	
WEL STEL (OEL STEL)	20 mg/m ³ insoluble compounds (as Mo) 10 mg/m ³ soluble compounds (as Mo)
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Switzerland - Occupational Exposure Limits	
Local name	Molybdène et ses composés insolubles / Molybdän und seine unlöslichen Verbindungen
MAK (OEL TWA) [1]	10 mg/m ³ (VME, inhalable dust)
Remark	NIOSH
Regulatory reference	www.suva.ch, 28.03.2022
USA - ACGIH - Occupational Exposure Limits	
Local name	Molybdenum, metal and insoluble compounds, as Mo
ACGIH OEL TWA	3 mg/m ³ (Respirable fraction) 10 mg/m ³ (Inhalable fraction)
Remark (ACGIH)	TLV® Basis: LRT irr
Regulatory reference	ACGIH 2022
Phosphorous (7723-14-0)	
Austria - Occupational Exposure Limits	
Local name	Tetraphosphor (Phosphor (gelb, weiß))
MAK (OEL TWA)	0.1 mg/m ³ (E)
MAK (OEL STEL)	0.2 mg/m ³ (E, 8x 5(Mow) min)
Regulatory reference	BGBl. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
Local name	Phosphore blanc # Fosfor (wit)
OEL TWA	0.1 mg/m ³
OEL TWA [ppm]	0.02 ppm
Regulatory reference	Koninklijk besluit/Arrêté royal 11/05/2021
Croatia - Occupational Exposure Limits	
Local name	Fosfor
GVI (OEL TWA) [1]	0.1 mg/m ³
KGVI (OEL STEL) [ppm]	0.3 ppm
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 1/2021)
Estonia - Occupational Exposure Limits	
Local name	Fosfor (kollane, valge)
OEL TWA	0.1 mg/m ³
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 15.05.2021, 1)
Greece - Occupational Exposure Limits	
Local name	Φωσφόρος (κίτρινος)
OEL TWA	0.1 mg/m ³
OEL STEL	0.3 mg/m ³

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

Phosphorous (7723-14-0)	
Regulatory reference	Π.Δ. 90/1999 - Προστασία της υγείας των εργαζομένων που εκτίθενται σε ορισμένους χημικούς παράγοντες κατά τη διάρκεια της εργασίας τους
Hungary - Occupational Exposure Limits	
Local name	FOSZFOR
AK (OEL TWA)	0.1 mg/m ³
CK (OEL STEL)	0.1 mg/m ³
Remark	i (ingerlő anyag, amely izgatja a bőrt, nyálkahártyát, szemet vagy mindhármát); N (Irritáló anyagok, egyszerű fojtógázok, csekély egészségkárosító hatással bíró anyagok)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Ireland - Occupational Exposure Limits	
Local name	Phosphorus, yellow
OEL TWA [1]	0.1 mg/m ³
OEL STEL	0.3 mg/m ³
Regulatory reference	Chemical Agents Code of Practice 2021
Latvia - Occupational Exposure Limits	
Local name	Fosfors
OEL TWA	0.03 mg/m ³
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325
Romania - Occupational Exposure Limits	
Local name	Fosfor roșu
OEL TWA	0.05 mg/m ³
OEL STEL	0.15 mg/m ³
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 53/2021)
United Kingdom - Occupational Exposure Limits	
Local name	Phosphorus, yellow
WEL TWA (OEL TWA) [1]	0.1 mg/m ³
WEL STEL (OEL STEL)	0.3 mg/m ³
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Norway - Occupational Exposure Limits	
Local name	Fosfor (gult)
Grenseverdi (OEL TWA) [1]	0.1 mg/m ³
Regulatory reference	FOR-2021-06-28-2248
Switzerland - Occupational Exposure Limits	
Local name	Phosphore jaune/blanc / Phosphor weiß/gelb [Tetraphosphor]
MAK (OEL TWA) [1]	0.02 mg/m ³ (i) / (e)
KZGW (OEL STEL)	0.02 mg/m ³ (i) / (e)
Critical toxicity	TGI, Poumons, MCorp, Foie / GIT, Lunge, KG, Leber
Notation	SS _C / SS _C
Remark	NIOSH

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

Phosphorous (7723-14-0)

Regulatory reference	www.suva.ch, 28.03.2022
----------------------	-------------------------

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

No additional information available

8.1.5. Control banding

No additional information available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Appropriate engineering controls:

Ensure good ventilation of the work station.

8.2.2. Personal protection equipment

Personal protective equipment:

Gloves. Dust formation: dust mask.

Personal protective equipment symbol(s):



8.2.2.1. Eye and face protection

Eye protection:

Safety glasses

8.2.2.2. Skin protection

Skin and body protection:

Wear suitable protective clothing

Hand protection:

Protective gloves

8.2.2.3. Respiratory protection

Respiratory protection:

[In case of inadequate ventilation] wear respiratory protection. Recommendation: Filter P3 or N95 or P100 based on exposure level. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard. Respirator selection must be based on known or anticipated exposure levels, the hazards of the material, and the safe working limits of the selected respirator. Recommendation: Filter P3 or N95 or P100 based on exposure level.

8.2.2.4. Thermal hazards

Thermal hazard protection:

Wear fire/flammable resistant/retardant clothing.

8.2.3. Environmental exposure controls

Environmental exposure controls:

Install and operate general and/or local exhaust ventilation systems of sufficient power to maintain airborne concentration below the defined or recommended limit. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard. Respirator selection must be based on known or anticipated exposure levels, the hazards of the material, and the safe working limits of the selected respirator. Avoid release to the environment.

Consumer exposure controls:

Comply with applicable regulations. Keep in a cool, well-ventilated place away from heat. Store in a well-ventilated place. Keep container tightly closed. Ensure adequate ventilation, especially in confined areas.

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Solid
Colour	: Grey.
Appearance	: Metal powder.
Odour	: Odourless.
Odour threshold	: Not available
Melting point	: ≈ 1415 °C
Freezing point	: Not applicable
Boiling point	: ≈ 2800 °C
Flammability	: Non flammable.
Explosive properties	: Fine dust clouds may form explosive mixtures with air. Risk of explosion if heated under confinement.
Explosive limits	: Not applicable
Lower explosion limit	: Not applicable
Upper explosion limit	: Not applicable
Flash point	: Not applicable
Auto-ignition temperature	: Not applicable
Decomposition temperature	: Not available
pH	: Not available
pH solution	: Not available
Viscosity, kinematic	: Not applicable
Solubility	: Not available
Partition coefficient n-octanol/water (Log Kow)	: Not available
Vapour pressure	: Not available
Vapour pressure at 50°C	: Not available
Density	: ≈ 8.2 g/cm ³
Relative density	: Not available
Relative vapour density at 20°C	: Not applicable
Particle size	: Not available

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Dust deflagration index : N/A (from 20 liters explosion sphere, 2Kj Test - No ignition made)

9.2.2. Other safety characteristics

Minimum ignition energy : Not determined
Other properties : Data in this section is Typical & based on tests for powder ranging from 5/15 microns to 45/63 microns powder (typical laser additive manufacturing powder. Particle size determined by ASTM B822 and ASTM B214 or similar methods and particle size distribution/PSD values such as D10 and D90)

SECTION 10: Stability and reactivity

10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

10.5. Incompatible materials

Acids. Combustible materials. Halogenated hydrocarbons. Oxidizing agent. Strong acids. Strong bases.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

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

iron, powder (7439-89-6)

LD50 oral rat	98600 mg/kg bodyweight (Equivalent or similar to OECD 401, Rat, Male, Experimental value, Oral, 28 day(s))
LC50 Inhalation - Rat	> 0.25 mg/l air (6 h, Rat, Male, Experimental value, Inhalation (dust), 28 day(s))

nickel, powder, particle diameter < 1 mm (7440-02-0)

LD50 oral rat	> 9000 mg/kg bodyweight (Equivalent or similar to OECD 401, Rat, Male / female, Experimental value, Oral, 15 day(s))
---------------	--

chromium (7440-47-3)

LD50 oral rat	> 5000 mg/kg bodyweight (Equivalent or similar to OECD 420, Rat, Male / female, Read-across, Oral, 14 day(s))
LC50 Inhalation - Rat	> 5.41 mg/l (OECD 403: Acute Inhalation Toxicity, 4 h, Rat, Male / female, Read-across, Inhalation (aerosol), 14 day(s))
LC50 Inhalation - Rat (Dust/Mist)	> 5.41 mg/l Source: ECHA

manganese, powder (7439-96-5)

LD50 oral rat	> 2000 mg/kg bodyweight (OECD 420: Acute Oral toxicity – Acute Toxic Class Method, Rat, Female, Experimental value, Oral, 14 day(s))
LC50 Inhalation - Rat	> 5.14 mg/l (OECD 403: Acute Inhalation Toxicity, 4 h, Rat, Male / female, Experimental value, Inhalation (dust), 14 day(s))
LC50 Inhalation - Rat (Dust/Mist)	> 5.14 mg/l Source: ECHA

silicon, powder, amorphous (7440-21-3)

LD50 oral rat	> 5000 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 401 (Acute Oral Toxicity)
LD50 dermal rabbit	> 5000 mg/kg bodyweight Animal: rabbit

Carbon (C) (7440-44-0)

LD50 oral rat	≥ 2000 mg/kg bodyweight Animal: rat, Animal sex: female, Guideline: OECD Guideline 423 (Acute Oral toxicity - Acute Toxic Class Method), Guideline: EU Method B.1 tris (Acute Oral Toxicity - Acute Toxic Class Method)
---------------	---

Sulfur (7704-34-9)

LD50 oral rat	> 2200 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 401 (Acute Oral Toxicity)
LD50 dermal rat	> 2000 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity)
LC50 Inhalation - Rat	> 5.4 mg/l air Animal: rat, Guideline: OECD Guideline 403 (Acute Inhalation Toxicity)

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

molybdenum (7439-98-7)	
LD50 oral rat	> 2000 mg/kg Source: ECHA
LD50 dermal rat	> 2000 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity)
LD50 dermal rabbit	> 2000 mg/kg Source: ECHA
LC50 Inhalation - Rat (Dust/Mist)	> 3.92 mg/l Source: ECHA
Phosphorous (7723-14-0)	
LD50 oral rat	> 2000 mg/kg bodyweight Animal: rat, Animal sex: female, Guideline: OECD Guideline 423 (Acute Oral toxicity - Acute Toxic Class Method), Guideline: EU Method B.1 tris (Acute Oral Toxicity - Acute Toxic Class Method), Guideline: EPA OPPTS 870.1100 (Acute Oral Toxicity)
LC50 Inhalation - Rat	> 5.75 mg/l air Animal: rat, Guideline: OECD Guideline 403 (Acute Inhalation Toxicity), Guideline: EU Method B.2 (Acute Toxicity (Inhalation)), Guideline: EPA OPPTS 870.1300 (Acute inhalation toxicity), Guideline: other:Japanese Ministry of Agriculture, Forestry and Fisheries, Test Data for Registration of Agricultural Chemicals, 12 NohSan No. 8147
LC50 Inhalation - Rat (Dust/Mist)	> 5.75 mg/l Source: ECHA
Skin corrosion/irritation	: Not classified
iron, powder (7439-89-6)	
pH	No data available in the literature
nickel, powder, particle diameter < 1 mm (7440-02-0)	
pH	No data available in the literature
chromium (7440-47-3)	
pH	6.8 Source: The ECOTOXicology database
Serious eye damage/irritation	: Not classified
iron, powder (7439-89-6)	
pH	No data available in the literature
nickel, powder, particle diameter < 1 mm (7440-02-0)	
pH	No data available in the literature
chromium (7440-47-3)	
pH	6.8 Source: The ECOTOXicology database
Respiratory or skin sensitisation	: May cause an allergic skin reaction.
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Suspected of causing cancer.
nickel, powder, particle diameter < 1 mm (7440-02-0)	
IARC group	2B - Possibly carcinogenic to humans
chromium (7440-47-3)	
IARC group	3 - Not classifiable
Reproductive toxicity	: Not classified
silicon, powder, amorphous (7440-21-3)	
NOAEL (animal/male, F0/P)	5000 mg/kg bodyweight Animal: rat, Animal sex: male, Guideline: other:OECD Guideline 478 (Genetic Toxicology: Rodent Dominant Lethal Test)

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

Carbon (C) (7440-44-0)	
NOAEL (animal/male, F0/P)	≥ 859 mg/kg bodyweight Animal: rat, Animal sex: male, Guideline: OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test)
STOT-single exposure	: Not classified
STOT-repeated exposure	: Causes damage to organs through prolonged or repeated exposure.
nickel, powder, particle diameter < 1 mm (7440-02-0)	
LOAEC (inhalation, rat,dust/mist/fume, 90 days)	0.004 mg/l air Animal: rat, Guideline: OECD Guideline 412 (Subacute Inhalation Toxicity: 28-Day Study)
STOT-repeated exposure	Causes damage to organs (lungs) through prolonged or repeated exposure (if inhaled).
chromium (7440-47-3)	
LOAEC (inhalation, rat,dust/mist/fume, 90 days)	≥ 0.0044 mg/l air Animal: rat, Guideline: OECD Guideline 413 (Subchronic Inhalation Toxicity: 90-Day Study)
silicon, powder, amorphous (7440-21-3)	
NOAEL (oral, rat, 90 days)	> 5000 mg/kg bodyweight Animal: rat, Animal sex: male
molybdenum (7439-98-7)	
NOAEC (inhalation, rat, dust/mist/fume, 90 days)	> 0.1 mg/l air Animal: rat, Guideline: OECD Guideline 413 (Subchronic Inhalation Toxicity: 90-Day Study)
Phosphorous (7723-14-0)	
NOAEL (oral, rat, 90 days)	1000 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test)
Aspiration hazard	: Not classified
GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)	
Viscosity, kinematic	Not applicable
iron, powder (7439-89-6)	
Viscosity, kinematic	Not applicable (solid)
nickel, powder, particle diameter < 1 mm (7440-02-0)	
Viscosity, kinematic	Not applicable (solid)
silicon, powder, amorphous (7440-21-3)	
Viscosity, kinematic	378.332 mm ² /s
Sulfur (7704-34-9)	
Viscosity, kinematic	Not applicable (solid)

11.2. Information on other hazards

No additional information available

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : May cause long lasting harmful effects to aquatic life.
Hazardous to the aquatic environment, short-term (acute) : Not classified

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

Hazardous to the aquatic environment, long-term (chronic) : Not classified

Not rapidly degradable

iron, powder (7439-89-6)	
LC50 - Fish [1]	8.65 mg/l Source: ECHA
LC50 - Other aquatic organisms [1]	106.3 mg/l Source: ECHA
EC50 - Crustacea [1]	> 100 mg/l Test organisms (species): Daphnia magna
EC50 - Crustacea [2]	> 10000 mg/l Test organisms (species): Daphnia magna
EC50 72h - Algae [1]	18 mg/l Source: ECHA
nickel, powder, particle diameter < 1 mm (7440-02-0)	
LC50 - Fish [1]	15.3 mg/l (96 h, Oncorhynchus mykiss, Semi-static system, Fresh water, Experimental value, Nickel ion)
chromium (7440-47-3)	
LC50 - Fish [1]	13.9 – 210 mg/l Source: GESTIS
EC50 - Crustacea [1]	17.7 – 18.9 mg/l Source: ECHA
EC50 72h - Algae [1]	0.1 – 17.8 mg/l Source: GESTIS
manganese, powder (7439-96-5)	
LC50 - Fish [1]	> 3.6 mg/l (OECD 203: Fish, Acute Toxicity Test, 96 h, Oncorhynchus mykiss, Semi-static system, Fresh water, Experimental value, GLP)
EC50 - Crustacea [1]	> 1.6 mg/l (OECD 202: Daphnia sp. Acute Immobilisation Test, 48 h, Daphnia magna, Static system, Fresh water, Experimental value, Locomotor effect)
EC50 72h - Algae [1]	4.5 mg/l Test organisms (species): Desmodesmus subspicatus (previous name: Scenedesmus subspicatus)
EC50 72h - Algae [2]	2.8 mg/l Test organisms (species): Desmodesmus subspicatus (previous name: Scenedesmus subspicatus)
ErC50 algae	4.5 mg/l (OECD 201: Alga, Growth Inhibition Test, 72 h, Desmodesmus subspicatus, Static system, Fresh water, Experimental value, GLP)
NOEC (chronic)	1.7 mg/l Test organisms (species): Ceriodaphnia dubia Duration: '8 d'
silicon, powder, amorphous (7440-21-3)	
EC50 72h - Algae [1]	≈ 250 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)
Sulfur (7704-34-9)	
LC50 - Fish [1]	> 5000 mg/l Test organisms (species): Oncorhynchus mykiss (previous name: Salmo gairdneri)
EC50 - Crustacea [1]	≥ 5000 mg/l Source: ECOTOX
NOEC chronic fish	9.3 mg/l Test organisms (species): Oncorhynchus mykiss (previous name: Salmo gairdneri) Duration: '28 d'
molybdenum (7439-98-7)	
LC50 - Fish [1]	0.79 mg/l (672 h, Salmo gairdneri)
EC50 72h - Algae [1]	289.2 mg/l Source: ECHA
Phosphorous (7723-14-0)	
LC50 - Fish [1]	33.2 mg/l (96 h, Brachydanio rerio, Literature study, Nominal concentration)
EC50 - Crustacea [1]	10.5 mg/l (48 h, Daphnia magna, Literature study, Nominal concentration)

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

Phosphorous (7723-14-0)	
EC50 72h - Algae [1]	18.3 mg/l (Scenedesmus subspicatus, Literature study, Growth rate)

12.2. Persistence and degradability	
iron, powder (7439-89-6)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)
nickel, powder, particle diameter < 1 mm (7440-02-0)	
Persistence and degradability	Biodegradability in soil: not applicable. Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)
chromium (7440-47-3)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)
manganese, powder (7439-96-5)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)
silicon, powder, amorphous (7440-21-3)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable
BOD (% of ThOD)	Not applicable
Sulfur (7704-34-9)	
Persistence and degradability	Biodegradability: not applicable.
BOD (% of ThOD)	Not applicable
molybdenum (7439-98-7)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable
BOD (% of ThOD)	Not applicable
Phosphorous (7723-14-0)	
Persistence and degradability	Biodegradability in soil: not applicable. Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

12.3. Bioaccumulative potential

iron, powder (7439-89-6)

Bioaccumulative potential Not bioaccumulative.

nickel, powder, particle diameter < 1 mm (7440-02-0)

BCF - Fish [1] 47 – 106 (30 day(s), Pimephales promelas, Flow-through system, Fresh water, Experimental value)

Bioaccumulative potential Low potential for bioaccumulation (BCF < 500).

chromium (7440-47-3)

BCF - Fish [1] 0.0048 (Pisces, Literature study, Dry weight)

Partition coefficient n-octanol/water (Log Pow) 0.23 Source: SRC

Bioaccumulative potential Not bioaccumulative.

manganese, powder (7439-96-5)

BCF - Fish [1] 81 (Pisces)

BCF - Other aquatic organisms [1] 300000 (Mollusca)

BCF - Other aquatic organisms [2] 125000 (Crustacea)

Bioaccumulative potential Not bioaccumulative.

Carbon (C) (7440-44-0)

Partition coefficient n-octanol/water (Log Pow) 0.78 Source: Quantitative Structure Activity Relation

Sulfur (7704-34-9)

Partition coefficient n-octanol/water (Log Pow) 0.23

Bioaccumulative potential Low potential for bioaccumulation (Log Kow < 4).

molybdenum (7439-98-7)

BCF - Fish [1] 260 – 500 (Tilapia rendalli)

Partition coefficient n-octanol/water (Log Pow) 0.23 Source: SRC Access on Jan 2006

Bioaccumulative potential No bioaccumulation data available.

Phosphorous (7723-14-0)

BCF - Fish [1] 22 l/kg (Salmo salar, Static system, Marine water, Experimental value)

Partition coefficient n-octanol/water (Log Pow) -0.27 Source: NIOSH

Bioaccumulative potential Low potential for bioaccumulation (BCF < 500).

12.4. Mobility in soil

iron, powder (7439-89-6)

Surface tension No data available in the literature

Ecology - soil No (test)data on mobility of the substance available.

nickel, powder, particle diameter < 1 mm (7440-02-0)

Surface tension No data available (test not performed)

Ecology - soil Adsorbs into the soil.

chromium (7440-47-3)

Surface tension No data available (test not performed)

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

chromium (7440-47-3)	
Ecology - soil	No (test)data on mobility of the substance available.
manganese, powder (7439-96-5)	
Ecology - soil	Adsorbs into the soil.
silicon, powder, amorphous (7440-21-3)	
Surface tension	740 mN/m (1410 °C)
Sulfur (7704-34-9)	
Surface tension	No data available in the literature
Organic Carbon Normalized Adsorption Coefficient (Log Koc)	1.12 (log Koc, SRC PCKOCWIN v2.0, Estimated value)
Ecology - soil	Highly mobile in soil.
molybdenum (7439-98-7)	
Ecology - soil	Adsorbs into the soil.
Phosphorous (7723-14-0)	
Ecology - soil	No (test)data on mobility of the substance available. Not toxic to plants.

12.5. Results of PBT and vPvB assessment

Component	
iron, powder (7439-89-6)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII
nickel, powder, particle diameter < 1 mm (7440-02-0)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII
chromium (7440-47-3)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII
manganese, powder (7439-96-5)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII
Sulfur (7704-34-9)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII
Phosphorous (7723-14-0)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

12.6. Endocrine disrupting properties

No additional information available

12.7. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional legislation (waste)	: Disposal must be done according to official regulations.
Waste treatment methods	: Dispose of contents/container in accordance with licensed collector's sorting instructions.
Sewage disposal recommendations	: Disposal must be done according to official regulations. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

Product/Packaging disposal recommendations	: Do not discharge into drains or the environment. Dispose of at authorized waste collection point. Disposal must be done according to official regulations. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals.
Additional information	: Industrial waste. Clean up even minor leaks or spills if possible without unnecessary risk.
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 number				
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
14.2. UN proper shipping name				
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
14.3. Transport hazard class(es)				
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
14.4. Packing group				
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
14.5. Environmental hazards				
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
No supplementary information available				

14.6. Special precautions for user

Overland transport

Not applicable

Transport by sea

Not applicable

Air transport

Not applicable

Inland waterway transport

Not applicable

Rail transport

Not applicable

14.7. Maritime transport in bulk according to IMO instruments

Not applicable

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

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)

EU restriction list (REACH Annex XVII)		
Reference code	Applicable on	Entry title or description
27.	nickel, powder, particle diameter < 1 mm	Nickel and its compounds

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

PIC Regulation (Prior Informed Consent)

Contains no substance(s) listed on the PIC list (Regulation EU 649/2012 concerning the export and import of hazardous chemicals)

POP Regulation (Persistent Organic Pollutants)

Contains no substance(s) listed on the POP list (Regulation EU 2019/1021 on persistent organic pollutants)

Ozone Regulation (1005/2009)

Contains no substance(s) listed on the Ozone Depletion list (Regulation EU 1005/2009 on substances that deplete the ozone layer)

Explosives Precursors Regulation (2019/1148)

Contains no substance(s) listed on the Explosives Precursors list (Regulation EU 2019/1148 on the marketing and use of explosives precursors)

Drug Precursors Regulation (273/2004)

Contains substance(s) listed on the Drug Precursors list (Regulation EC 273/2004 on the manufacture and the placing on market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances)

Name	CN designation	CAS-No.	CN code	Category	Threshold	Annex
Red phosphorus		7723-14-0	2804 70 00	Category 2	0.1 kg	Annex I, Annex II

15.1.2. National regulations

France

Occupational diseases	
Code	Description
RG 5	Occupational diseases related to contact with phosphorus and phosphorus sesquisulphide
RG 37	Professional skin disorders caused by oxides and nickel salts
RG 37 BIS	Respiratory disorders caused by oxides and nickel salts
RG 37 TER	Cancers caused by roasting operations of nickel mattes

Germany

- Employment restrictions : Observe restrictions according Act on the Protection of Working Mothers (MuSchG).
Observe restrictions according Act on the Protection of Young People in Employment (JArbSchG).
- Water hazard class (WGK) : WGK 2, Significantly hazardous to water (Classification according to AwSV, Annex 1).
- Chemicals Prohibition Ordinance (ChemVerbotsV) : This product is subject to ChemVerbotsV Annex 2 Entry 1. The following requirements must be observed: authorization requirement (according to § 6 paragraph 1 sentence 1), basic requirements for carrying out the delivery (according to § 8 paragraph 1, 3 and 4), identification and documentation (according to § 9 paragraph 1 to 3) and exclusion of the shipping route (according to § 10).
- Hazardous Incident Ordinance (12. BImSchV) : Is not subject of the Hazardous Incident Ordinance (12. BImSchV)

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

Netherlands

ABM category	: B(2) - toxic for aquatic organisms
SZW-lijst van kankerverwekkende stoffen	: None of the components are listed
SZW-lijst van mutagene stoffen	: None of the components are listed
SZW-lijst van reprotoxische stoffen – Borstvoeding	: None of the components are listed
SZW-lijst van reprotoxische stoffen – Vruchtbaarheid	: manganese, powder is listed
SZW-lijst van reprotoxische stoffen – Ontwikkeling	: manganese, powder is listed

Denmark

Danish National Regulations	: Young people below the age of 18 years are not allowed to use the product Pregnant/breastfeeding women working with the product must not be in direct contact with the product The requirements from the Danish Working Environment Authorities regarding work with carcinogens must be followed during use and disposal
-----------------------------	--

Switzerland

Storage class (LK)	: LK 6.1 - Toxic materials
Chemicals Ordinance (SR 813.11)	: Group 2

15.2. Chemical safety assessment

No chemical safety assessment has been carried out

SECTION 16: Other information

Abbreviations and acronyms:

CLP	Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
WGK	Water Hazard Class
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute Toxicity Estimate
BCF	Bioconcentration factor
BLV	Biological limit value
BOD	Biochemical oxygen demand (BOD)
COD	Chemical oxygen demand (COD)
DMEL	Derived Minimal Effect level
DNEL	Derived-No Effect Level
EC-No.	European Community number
EC50	Median effective concentration
EN	European Standard
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Median lethal concentration
LD50	Median lethal dose
LOAEL	Lowest Observed Adverse Effect Level
NOAEC	No-Observed Adverse Effect Concentration

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

Abbreviations and acronyms:	
NOAEL	No-Observed Adverse Effect Level
NOEC	No-Observed Effect Concentration
OECD	Organisation for Economic Co-operation and Development
OEL	Occupational Exposure Limit
PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
SDS	Safety Data Sheet
STP	Sewage treatment plant
ThOD	Theoretical oxygen demand (ThOD)
TLM	Median Tolerance Limit
VOC	Volatile Organic Compounds
CAS-No.	Chemical Abstract Service number
N.O.S.	Not Otherwise Specified
vPvB	Very Persistent and Very Bioaccumulative
ED	Endocrine disrupting properties

Data sources : ECHA (European Chemicals Agency). 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.

Training advice : Normal use of this product shall imply use in accordance with the instructions on the packaging.

Full text of H- and EUH-statements:	
Acute Tox. 4 (Oral)	Acute toxicity (oral), Category 4
Aquatic Chronic 3	Hazardous to the aquatic environment – Chronic Hazard, Category 3
Carc. 2	Carcinogenicity, Category 2
Flam. Sol. 1	Flammable solids, Category 1
Flam. Sol. 2	Flammable solids, Category 2
H228	Flammable solid.
H302	Harmful if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure.
H412	Harmful to aquatic life with long lasting effects.
Skin Irrit. 2	Skin corrosion/irritation, Category 2
Skin Sens. 1	Skin sensitisation, Category 1
STOT RE 1	Specific target organ toxicity – Repeated exposure, Category 1

The classification complies with : ATP 12

GE+ 316L, Stainless Steel 316L DMLM powder (CL 20ES)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

Safety Data Sheet (SDS), EU

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new processed material.