



# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

Issue date: 09/23/2021 Revision date: 8/25/2021 Supersedes version of: 10/4/2019 Version: 5.0

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

#### 1.1. Product identifier

Product form	: Mixture
Name	: GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)
Trade name	: GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)
Product code	: GEAPS005-XX (90022)
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, 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.
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#### 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](mailto:GEAdd.SDS@ge.com) - [www.advancedpowders.com](http://www.advancedpowders.com) ;  
<https://www.ge.com/additive/powders-overview>

##### 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 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)
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### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

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

Respiratory sensitisation, Category 1	H334
Skin sensitisation, Category 1	H317
Carcinogenicity, Category 2	H351

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

Specific target organ toxicity — Repeated exposure, Category 1 H372

Hazardous to the aquatic environment — Chronic Hazard, Category 4 H413

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

### Adverse physicochemical, human health and environmental effects

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

## 2.2. Label elements

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

Hazard pictograms (CLP)



GHS08

Signal word (CLP)

: Danger

Contains

: cobalt, nickel, powder, particle diameter < 1 mm

Hazard statements (CLP)

: H317 - May cause an allergic skin reaction.  
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled.  
H351 - Suspected of causing cancer.  
H372 - Causes damage to organs through prolonged or repeated exposure.  
H413 - May cause long lasting harmful effects to aquatic life.

Precautionary statements (CLP)

: P201 - Obtain special instructions before use.  
P261 - Avoid breathing dust, fume.  
P280 - Wear protective clothing, eye protection, face protection, protective gloves.  
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
P321 - Specific treatment (see supplemental first aid instruction on this label).  
P342+P311 - If experiencing respiratory symptoms: Call a POISON CENTER or doctor.

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.

## 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	55 – 70	Flam. Sol. 2, H228

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
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)	CAS-No.: 7440-02-0 EC-No.: 231-111-4 EC Index-No.: 028-002-01-4 REACH-no: 01-2119438727-29-0174	17 – 19	Skin Sens. 1, H317 Carc. 2, H351 STOT RE 1, H372 Aquatic Chronic 3, H412
cobalt substance with national workplace exposure limit(s) (AT, BE, BG, CZ, DE, DK, EE, ES, FI, GB, GR, HR, HU, IE, IT, LT, LV, NL, PL, PT, RO, SE, SK, NO, CH)	CAS-No.: 7440-48-4 EC-No.: 231-158-0 EC Index-No.: 027-001-00-9 REACH-no: 01-2119517392-44, N/A	8 – 10	Resp. Sens. 1, H334 Skin Sens. 1, H317 Muta. 2, H341 Carc. 1B, H350 Repr. 1B, H360F Aquatic Chronic 4, H413
molybdenum	CAS-No.: 7439-98-7 EC-No.: 231-107-2 REACH-no: 01-2119472304-43	4 – 5	Not classified
titanium, powder, dry, slightly self-heating substance with national workplace exposure limit(s) (BG, LV, PL, RO)	CAS-No.: 7440-32-6 EC-No.: 231-142-3 REACH-no: 01-2119484878-14	0.5 – 1.5	Not classified
chromium substance with national workplace exposure limit(s) (AT, BE, BG, CY, 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	≤ 0.25	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	≤ 0.15	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

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)

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.

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

### 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.
Unsuitable extinguishing media	: Water. Carbon dioxide (CO <sub>2</sub> ). dry chemical powder. Halon. 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.
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	: Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. 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.
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#### 6.1.1. For non-emergency personnel

Emergency procedures	: Only qualified personnel equipped with suitable protective equipment may intervene. 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. See section 8 of the SDS for more information on personal protective equipment.
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# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

### 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. Notify authorities if product enters sewers or public waters. 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.

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. Take all necessary technical measures to avoid or minimize the release of the product on the workplace. Limit quantities of product at the minimum necessary for handling and limit the number of exposed workers. Provide local exhaust or general room ventilation. Wear personal protective equipment. Floors, walls and other surfaces in the hazard area must be cleaned regularly. 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. Provide local exhaust or general room ventilation to minimize exposure to dust. Do not breathe dust/fume/gas/mist/vapours/spray.

Hygiene measures : Separate working clothes from town clothes. Launder separately. 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 : 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. Store in a well-ventilated place. Keep cool. Protect from sunlight. Keep away from ignition sources. Store away from other materials.

### 7.3. Specific end use(s)

No additional information available

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

##### 8.1.1 National occupational exposure and biological limit values

cobalt (7440-48-4)	
<b>Austria - Occupational Exposure Limits</b>	
Local name	Cobalt und seine Verbindungen (Cobalt als Cobaltmetall, Cobaltoxid, Cobaltsulfid und Cobaltsulfat, Staub von Cobaltlegierungen)
TRK (OEL TWA)	0.5 mg/m <sup>3</sup> (Herstellung von Cobaltpulver und Katalysatoren, Hartmetallund) (als Co berechnet, E) 0.1 mg/m <sup>3</sup> (im übrigen) (als Co berechnet, E)
TRK (OEL STEL)	2 mg/m <sup>3</sup> (Herstellung von Cobaltpulver und Katalysatoren, Hartmetallund) (als Co berechnet, E, 4x 15(Miw) min) 0.4 mg/m <sup>3</sup> (im übrigen) (als Co berechnet, E, 4x 15(Miw) min)
Remark	H, Sah. Krebszeugend: III A2
Regulatory reference	BGBI. II Nr. 156/2021
<b>Austria - Biological limit values</b>	
Local name	Cobalt und seine Verbindungen
BLV	10 µg/l Parameter: Cobalt - Untersuchungsmaterial: Harn
Remark	Eignung mit vorzeitiger Folgeuntersuchung: Überschreiten des Grenzwertes für Cobalt im Harn. 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)
<b>Belgium - Occupational Exposure Limits</b>	
Local name	Cobalt métal (fumées et poussières) (en Co) # Kobaltmetaal (stof en rook) als Co
OEL TWA	0.02 mg/m <sup>3</sup>
Regulatory reference	Koninklijk besluit/Arrêté royal 19/11/2020
<b>Bulgaria - Occupational Exposure Limits</b>	
Local name	Кобалт
OEL TWA	0.1 mg/m <sup>3</sup>
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.)
<b>Croatia - Occupational Exposure Limits</b>	
Local name	Kobalt i spojevi (kao Co)
GVI (OEL TWA) [1]	0.1 mg/m <sup>3</sup>
Remark	Alergen (koža (tvar koja može izazvati alergijsku reakciju na koži (H317)) i udisanje (tvar koja udisanjem može izazvati simptome alergije ili astme ili poteškoće s disanjem (H334)))

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>cobalt (7440-48-4)</b>	
Regulatory reference	Pravilnik o izmjenama i dopunama Pravilnika o graničnim vrijednostima izloženosti opasnim tvarima pri radu i o biološkim graničnim vrijednostima (NN 1/2021)
<b>Czech Republic - Occupational Exposure Limits</b>	
Local name	Kobalt a jeho sloučeniny, jako Co
PEL (OEL TWA)	0.05 mg/m <sup>3</sup>
NPK-P (OEL C)	0.1 mg/m <sup>3</sup>
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 195/2021 Sb.)
<b>Denmark - Occupational Exposure Limits</b>	
Local name	Cobalt, pulver, støv, røg og uorganiske forbindelser
OEL TWA [1]	0.01 mg/m <sup>3</sup> (Grænseværdie (langvarig), dust, fume, powder)
Regulatory reference	BEK nr 1426 af 28. juni 2021
<b>Estonia - Occupational Exposure Limits</b>	
Local name	Koobalt ja anorgaanilised ühendid (arvutatud koobaltile)
OEL TWA	0.05 mg/m <sup>3</sup>
Remark	S (Sensibiliseeriv aine)
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 17.10.2019, 2); Vabariigi Valitsuse 10. märtsi 2019. a määruse nr 84
<b>Finland - Occupational Exposure Limits</b>	
Local name	Koboltti ja sen epäorgaaniset yhdisteet
HTP (OEL TWA) [1]	0.02 mg/m <sup>3</sup> (arvo (8h))
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
<b>Finland - Biological limit values</b>	
Local name	Koboltti ja sen epäorgaaniset yhdisteet
BLV	130 nmol/l Parametri: Virtsan koboltti - Näytteenottoajankohta: Työvaiheen tai työvuoron päätyttyä työviikon tai altistumisjakson loputtua
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
<b>Germany - Occupational Exposure Limits (TRGS 910)</b>	
Local name	Cobalt und Cobaltverbindungen, als Carc.1A, Carc.1B eingestuft
Acceptable concentration (Weight conc.)	0.16 µg/m <sup>3</sup> (A)
Notes	b) Akzeptanzkonzentration assoziiert mit Risiko 4:10000
Tolerance concentration (Weight conc.)	5 µg/m <sup>3</sup> (A)
Remark	(4) Die Konzentrationen beziehen sich auf den Elementgehalt des entsprechenden Metalls.; Siehe TRGS 561
Regulatory reference	TRGS 910
<b>Greece - Occupational Exposure Limits</b>	
Local name	Κοβάλτιο μεταλλικό (σκόνη και καπνοί)
OEL TWA	0.1 mg/m <sup>3</sup> (dust, fume)
Regulatory reference	Π.Δ. 90/1999 - Προστασία της υγείας των εργαζομένων που εκτίθενται σε ορισμένους χημικούς παράγοντες κατά τη διάρκεια της εργασίας τους
<b>Hungary - Occupational Exposure Limits</b>	
Local name	KOBALT ÉS SZERVETLEN VEGYÜLETEI (Co-ra számítva)



# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>cobalt (7440-48-4)</b>	
AK (OEL TWA)	0.1 mg/m <sup>3</sup>
CK (OEL STEL)	0.4 mg/m <sup>3</sup>
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
<b>Hungary - Biological Exposure Indices</b>	
Local name	Kobalt
BEI	0.01 mg/g creatinine Biológiai expozíciós (hatás) mutató: kobalt - Biológiai minta: vizeletben - Mintavétel ideje: m.v. (műszak végén) 0.019 µmol/mmol Creatinine Biológiai expozíciós (hatás) mutató: kobalt - 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
<b>Ireland - Occupational Exposure Limits</b>	
Local name	Cobalt & cobalt compounds (as Co)
OEL TWA [1]	0.1 mg/m <sup>3</sup> (8 hours ref)
OEL STEL	0.3 mg/m <sup>3</sup> (15 min ref, calculated)
Regulatory reference	Chemical Agents Code of Practice 2021
<b>Ireland - Biological limit values</b>	
Local name	Cobalt
BLV	15 µg/l Parameter: cobalt - Medium: urine - Sampling time: End of shift at end of workweek - Notations: B (Background) 1 µg/l Parameter: cobalt - Medium: blood - Sampling time: End of shift at end of workweek - Notations: Sq (Semi-quantitative)
Regulatory reference	Biological Monitoring Guidelines (HSA, 2011)
<b>Italy - Occupational Exposure Limits</b>	
OEL TWA	0.02 mg/m <sup>3</sup>
<b>Latvia - Occupational Exposure Limits</b>	
Local name	Kobalts
OEL TWA	0.5 mg/m <sup>3</sup>
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325
<b>Lithuania - Occupational Exposure Limits</b>	
IPRV (OEL TWA)	0.05 mg/m <sup>3</sup>
<b>Netherlands - Occupational Exposure Limits</b>	
Local name	Kobalt
TGG-8u (OEL TWA)	0.02 mg/m <sup>3</sup>
Regulatory reference	Arbeidsomstandighedenregeling 2021
<b>Poland - Occupational Exposure Limits</b>	
Local name	Kobalt metaliczny i jego związki nieorganiczne
NDS (OEL TWA)	0.02 mg/m <sup>3</sup>
Regulatory reference	Dz. U. 2018 poz. 1286
<b>Portugal - Occupational Exposure Limits</b>	
Local name	Cobalto e compostos inorgânicos, expressos em Co



# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>cobalt (7440-48-4)</b>	
OEL TWA	0.02 mg/m <sup>3</sup>
Remark	A3 (Agente carcinogénico confirmado nos animais de laboratorio con relevância desconhecida no Homem); IBE (Índice biológico de exposição)
Regulatory reference	Norma Portuguesa NP 1796:2014
<b>Portugal - Biological Exposure Indices</b>	
Local name	Cobalto
BEI	15 µg/l Parâmetro: Cobalto - Meio: urina - Momento da amostragem: Fim do turno no fim da semana de trabalho - Notação: Vb (Valor basal) 1 µg/l Parâmetro: Cobalto - Meio: sangue - Momento da amostragem: Fim do turno no fim da semana de trabalho - Notação: Vb (Valor basal), Sq (Semi quantitativo)
Regulatory reference	Norma Portuguesa NP 1796:2014
<b>Romania - Occupational Exposure Limits</b>	
Local name	Cobalt
OEL TWA	0.05 mg/m <sup>3</sup>
OEL STEL	0.1 mg/m <sup>3</sup>
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 53/2021)
<b>Romania - Biological limit values</b>	
Local name	Cobalt
BLV	15 µg/l Indicador biologic: Cobalt - Material biologic: urină - Momentul recoltării: sfârşit de săptămână 1 µg/l Indicador biologic: Cobalt - Material biologic: sânge - Momentul recoltării: sfârşit de săptămână
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 584/2018)
<b>Slovakia - Occupational Exposure Limits</b>	
Local name	Kobalt a jeho zlúčeniny (ako Co)
NPHV (OEL TWA) [1]	0.5 mg/m <sup>3</sup> (respirable dust)
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (236/2020 Z. z.)
<b>Spain - Occupational Exposure Limits</b>	
Local name	Cobalto elemental
VLA-ED (OEL TWA) [1]	0.02 mg/m <sup>3</sup>
Remark	VLB® (Agente químico que tiene Valor Límite Biológico), Sen (Sensibilizante).
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2021. INSHT
<b>Spain - Biological limit values</b>	
Local name	Cobalto y compuestos inorgánicos excepto óxidos

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

cobalt (7440-48-4)	
BLV	15 µg/l Parámetro: Cobalto - Medio: Orina - Momento de muestreo: Final de la semana laboral - Notas: F (Fondo. El indicador está generalmente presente en cantidades detectables en personas no expuestas laboralmente. Estos niveles de fondo están considerados en el valor VLB) 1 µg/l Parámetro: Cobalto - Medio: Sangre - Momento de muestreo: Final de la semana laboral - Notas: F (Fondo. El indicador está generalmente presente en cantidades detectables en personas no expuestas laboralmente. Estos niveles de fondo están considerados en el valor VLB), S (Significa que el indicador biológico es un indicador de exposición al agente químico en cuestión, pero la interpretación cuantitativa de su medida es ambigua (semicuantitativa). Estos indicadores biológicos deben utilizarse como una prueba de selección (screening) cuando no se pueda realizar una prueba cuantitativa o usarse como prueba de confirmación, si la prueba cuantitativa no es específica y el origen del determinante es dudoso)
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2021. INSHT
Sweden - Occupational Exposure Limits	
Local name	Kobolt, och oorg. föreningar (som Co)
NGV (OEL TWA)	0.02 mg/m <sup>3</sup> inhalerbar fraktion
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
United Kingdom - Occupational Exposure Limits	
Local name	Cobalt
WEL TWA (OEL TWA) [1]	0.1 mg/m <sup>3</sup>
WEL STEL (OEL STEL)	0.3 mg/m <sup>3</sup> (calculated)
Remark	Carc (cobalt dichloride and sulphate)(Capable of causing cancer and/or heritable genetic damage), Sen (Capable of causing occupational asthma)
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Norway - Occupational Exposure Limits	
Grenseverdi (OEL TWA) [1]	0.02 mg/m <sup>3</sup> (AN, fume)
Korttidsverdi (OEL STEL)	0.06 mg/m <sup>3</sup> (fume)
Switzerland - Occupational Exposure Limits	
Local name	Cobalt et ses composés / Cobalt und seine Verbindungen [Kobalt]
MAK (OEL TWA) [1]	0.05 mg/m <sup>3</sup> (VME, inhalable fraction, dust, Aerosol)
Critical toxicity	Poumons, Asthme, Cœur / Lunge, Asthma, Herz
Notation	R, S, C1 <sub>B</sub> , M2, R1 <sub>BF</sub> , B / H, S, C1 <sub>B</sub> , M2, R1 <sub>BF</sub> , B
Remark	HSE, NIOSH, BG
Regulatory reference	www.suva.ch, 01.01.2021
Switzerland - BAT	
Local name	Cobalt et ses composés / Cobalt und seine Verbindungen
BAT	30 µg/l (509 nmol/l; Paramètre biologique: Cobalt; Substrat d'examen: Urine; Moment du prélèvement: Fin de l'exposition, de la période de travail.) / (509 nmol/l; Biologischer Parameter: Cobalt; Untersuchungsmaterial: Urin; Probennahmezeitpunkt: Expositionsende, bzw. Schichtende.)
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	Cobalt and inorganic compounds, as Co

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>cobalt (7440-48-4)</b>	
ACGIH OEL TWA	0.02 mg/m <sup>3</sup> (Inhalable fraction)
Remark (ACGIH)	TLV® Basis: Pulm func changes. Notations: DSEN; RSEN; A3 (Confirmed Animal Carcinogen with Unknown Relevance to Humans); BEI
Regulatory reference	ACGIH 2021
<b>USA - ACGIH - Biological Exposure Indices</b>	
Local name	COBALT AND INORGANIC COMPOUNDS
BEI	15 µg/l Parameter: Cobalt - Medium: urine - Sampling time: End of shift at end of workweek - Notations: Ns
Regulatory reference	ACGIH 2021
<b>titanium, powder, dry, slightly self-heating (7440-32-6)</b>	
<b>Bulgaria - Occupational Exposure Limits</b>	
Local name	Титан
OEL TWA	1 mg/m <sup>3</sup>
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.)
<b>Latvia - Occupational Exposure Limits</b>	
Local name	Titāns
OEL TWA	10 mg/m <sup>3</sup>
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325
<b>Poland - Occupational Exposure Limits</b>	
Local name	Tytan i jego związki
NDS (OEL TWA)	10 mg/m <sup>3</sup>
NDSch (OEL STEL)	30 mg/m <sup>3</sup>
Regulatory reference	Dz. U. 2018 poz. 1286
<b>Romania - Occupational Exposure Limits</b>	
Local name	Titan
OEL TWA	10 mg/m <sup>3</sup>
OEL STEL	15 mg/m <sup>3</sup>
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 53/2021)
<b>nickel, powder, particle diameter &lt; 1 mm (7440-02-0)</b>	
<b>EU - Indicative Occupational Exposure Limit (IOEL)</b>	
Local name	Nickel metal
Remark	(Year of adoption 2011)
Regulatory reference	SCOEL Recommendations
<b>EU - Biological Limit Value (BLV)</b>	
Local name	Nickel and nickel compounds
Regulatory reference	SCOEL List of recommended health-based BLVs and BGVs

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>nickel, powder, particle diameter &lt; 1 mm (7440-02-0)</b>	
<b>Austria - Occupational Exposure Limits</b>	
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 <sup>3</sup> (als Ni berechnet, E)
TRK (OEL STEL)	2 mg/m <sup>3</sup> (als Ni berechnet, E, 4x 15(Miw) min)
Remark	Sah. Krebs erzeugend: III A1
Regulatory reference	BGBl. II Nr. 156/2021
<b>Austria - Biological limit values</b>	
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)
<b>Belgium - Occupational Exposure Limits</b>	
Local name	Nickel (métal) # Nikkel (metaal)
OEL TWA	1 mg/m <sup>3</sup>
Regulatory reference	Koninklijk besluit/Arrêté royal 19/11/2020
<b>Bulgaria - Occupational Exposure Limits</b>	
Local name	Никел
OEL TWA	0.05 mg/m <sup>3</sup> (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.)
<b>Bulgaria - Biological limit values</b>	
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.)
<b>Croatia - Occupational Exposure Limits</b>	
Local name	Nikal
GVI (OEL TWA) [1]	0.5 mg/m <sup>3</sup>
Remark	Alergen koža (tvar koja može izazvati alergijsku reakciju na koži (H317))

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>nickel, powder, particle diameter &lt; 1 mm (7440-02-0)</b>	
Regulatory reference	Pravilnik o izmjenama i dopunama Pravilnika o graničnim vrijednostima izloženosti opasnim tvarima pri radu i o biološkim graničnim vrijednostima (NN 1/2021)
<b>Croatia - Biological limit values</b>	
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 izmjenama i dopunama Pravilnika o graničnim vrijednostima izloženosti opasnim tvarima pri radu i o biološkim graničnim vrijednostima (NN 91/2018)
<b>Czech Republic - Occupational Exposure Limits</b>	
Local name	Nikl
PEL (OEL TWA)	0.5 mg/m <sup>3</sup>
NPK-P (OEL C)	1 mg/m <sup>3</sup>
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 195/2021 Sb.)
<b>Czech Republic - Biological limit values</b>	
Local name	Nikl
BLV	0.04 mg/g creatinine Ukazatel: Nikl - Biološki uzorak: moči - Doba odběru: nerozhoduje 0.077 µmol/mmol Creatinine Ukazatel: Nikl - Biološki uzorak: moči - Doba odběru: nerozhoduje
Regulatory reference	Vyhláška č. 107/2013 Sb. (kterou se mění vyhláška č. 432/2003 Sb.)
<b>Denmark - Occupational Exposure Limits</b>	
Local name	Nikkel, pulver og støv
OEL TWA [1]	0.05 mg/m <sup>3</sup> beregnet som Ni
Regulatory reference	BEK nr 1426 af 28. juni 2021
<b>Estonia - Occupational Exposure Limits</b>	
Local name	Nikkel, metall
OEL TWA	0.5 mg/m <sup>3</sup>
Remark	S (Sensibiliseeriv aine)
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 17.10.2019, 2); Vabariigi Valitsuse 10. märtsi 2019. a määruse nr 84
<b>Finland - Occupational Exposure Limits</b>	
Local name	Nikkeli, metalli
HTP (OEL TWA) [1]	0.01 mg/m <sup>3</sup> Ni, alveolijae
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
<b>Finland - Biological limit values</b>	
Local name	Nikkeli, metalli
BLV	0.1 µmol/l Parametri: Virtsan nikkeli - Näytteenottoajankohta: Työvuoron päätyttyä työviikon tai altistumisjakson loputtua

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>nickel, powder, particle diameter &lt; 1 mm (7440-02-0)</b>	
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveystieteiden ministeriö)
<b>France - Occupational Exposure Limits</b>	
Local name	Nickel (métal)
VME (OEL TWA)	1 mg/m <sup>3</sup>
Remark	Valeurs recommandées/admises; substance classée cancérogène de catégorie 2
Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 984, 2016)
<b>Germany - Occupational Exposure Limits (TRGS 900)</b>	
Local name	Nickel und Nickelverbindungen
AGW (OEL TWA) [1]	0.03 mg/m <sup>3</sup> (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
<b>Hungary - Biological Exposure Indices</b>	
Local name	Nikkel
BEI	0.003 mg/l Biológiai expozíció (hatás) mutató: nikkel - Biológiai minta: vizeletben - Mintavétel ideje: mhv., m.v. (munkahét végén, műszak végén) 0.051 µmol/l Biológiai expozíció (hatás) mutató: nikkel - 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
<b>Ireland - Occupational Exposure Limits</b>	
Local name	Nickel
OEL TWA [1]	0.5 mg/m <sup>3</sup>
Regulatory reference	Chemical Agents Code of Practice 2021
<b>Ireland - Biological limit values</b>	
Local name	Nickel
BLV	3 µg/l Parameter: Ni - Medium: urine - Sampling time: After several consecutive working shifts
Regulatory reference	Biological Monitoring Guidelines (HSA, 2011)

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

nickel, powder, particle diameter < 1 mm (7440-02-0)	
<b>Latvia - Occupational Exposure Limits</b>	
Local name	Niķelis, niķeļa oksīdi, sulfīdi un savienojumu maisījumi (pēc Ni)
OEL TWA	0.05 mg/m <sup>3</sup>
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2011. gada 1. februārī noteikumiem Nr. 92)
<b>Latvia - Biological Exposure Indices</b>	
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)
<b>Lithuania - Occupational Exposure Limits</b>	
Local name	Nikelis
IPRV (OEL TWA)	0.5 mg/m <sup>3</sup>
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
<b>Poland - Occupational Exposure Limits</b>	
Local name	Nikiel i jego związki, z wyjątkiem tetrakarbonylku niklu (niklu karbonylku)
NDS (OEL TWA)	0.25 mg/m <sup>3</sup> w przeliczeniu na Ni
Regulatory reference	Dz. U. 2018 poz. 1286
<b>Portugal - Occupational Exposure Limits</b>	
Local name	Níquel, expresso em Ni Elementar
OEL TWA	1.5 mg/m <sup>3</sup> I (Fração inalável)
Remark	A5 (Agente não suspeito de ser carcinogénico no Homem)
Regulatory reference	Norma Portuguesa NP 1796:2014
<b>Slovenia - Occupational Exposure Limits</b>	
Local name	nikelj – kovina
OEL TWA	0.006 mg/m <sup>3</sup>
OEL STEL	0.048 mg/m <sup>3</sup>
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
<b>Spain - Occupational Exposure Limits</b>	
Local name	Níquel metal
VLA-ED (OEL TWA) [1]	1 mg/m <sup>3</sup>
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 2021. INSHT



# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>nickel, powder, particle diameter &lt; 1 mm (7440-02-0)</b>	
<b>Sweden - Occupational Exposure Limits</b>	
Local name	Nickel, metall
NGV (OEL TWA)	0.5 mg/m <sup>3</sup> totaldamm
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
<b>United Kingdom - Occupational Exposure Limits</b>	
Local name	Nickel
WEL TWA (OEL TWA) [1]	0.5 mg/m <sup>3</sup>
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
<b>Switzerland - Occupational Exposure Limits</b>	
Local name	Nickel, métal / Nickel, Metall
MAK (OEL TWA) [1]	0.5 mg/m <sup>3</sup> (i) / (e)
Critical toxicity	Peau, Fibpulm / Haut, Lungenfibrose
Notation	S, C2, B / S, C2, B
Remark	HSE, NIOSH, BG
Regulatory reference	www.suva.ch, 01.01.2021
<b>Switzerland - BAT</b>	
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
<b>USA - ACGIH - Occupational Exposure Limits</b>	
Local name	Nickel, elemental
ACGIH OEL TWA	1.5 mg/m <sup>3</sup> (Inhalable fraction)
Remark (ACGIH)	TLV® Basis: Dermatitis; pneumoconiosis. Notations: A5 (Not Suspected as a Human Carcinogen)
Regulatory reference	ACGIH 2021
<b>USA - ACGIH - Biological Exposure Indices</b>	
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 2021

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

molybdenum (7439-98-7)	
<b>Austria - Occupational Exposure Limits</b>	
Local name	Molybdän und Molybdänverbindungen, unlösliche
MAK (OEL TWA)	10 mg/m <sup>3</sup> (als Mo berechnet, E)
MAK (OEL STEL)	20 mg/m <sup>3</sup> (als Mo berechnet, E, 2x 60(Miw) min)
Regulatory reference	BGBI. II Nr. 156/2021
<b>Belgium - Occupational Exposure Limits</b>	
Local name	Molybdène (en Mo) # Molybdeenverbindungen (als Mo)
OEL TWA	10 mg/m <sup>3</sup> (composés insolubles) # (onoplosbaar) 0.5 mg/m <sup>3</sup> (composés solubles) (fraction alvéolaire) # (oplosbaar) (inadembare fractie)
Regulatory reference	Koninklijk besluit/Arrêté royal 19/11/2020
<b>Bulgaria - Occupational Exposure Limits</b>	
Local name	Молибден
OEL TWA	10 mg/m <sup>3</sup> (и негови съединения (като молибден)) 5 mg/m <sup>3</sup> (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.)
<b>Czech Republic - Occupational Exposure Limits</b>	
Local name	Molybden
PEL (OEL TWA)	5 mg/m <sup>3</sup>
NPK-P (OEL C)	25 mg/m <sup>3</sup>
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 195/2021 Sb.)
<b>Estonia - Occupational Exposure Limits</b>	
OEL TWA	10 mg/m <sup>3</sup> (total dust) 5 mg/m <sup>3</sup> (respirable dust)
<b>Finland - Occupational Exposure Limits</b>	
HTP (OEL TWA) [1]	0.5 mg/m <sup>3</sup> (arvo 8h)
<b>Ireland - Occupational Exposure Limits</b>	
Local name	Molybdenum compounds (as Mo)
OEL TWA [1]	0.5 mg/m <sup>3</sup> R (Respirable Fraction) 10 mg/m <sup>3</sup> soluble compounds, I (Inhalable Fraction) 3 mg/m <sup>3</sup> insoluble compounds, R (Respirable Fraction)
Regulatory reference	Chemical Agents Code of Practice 2021
<b>Lithuania - Occupational Exposure Limits</b>	
IPRV (OEL TWA)	10 mg/m <sup>3</sup> (inhalable fraction) 5 mg/m <sup>3</sup> (respirable fraction)
<b>Poland - Occupational Exposure Limits</b>	
Local name	Molibden i jego związki
NDS (OEL TWA)	4 mg/m <sup>3</sup> w przeliczeniu na Mo
NDSch (OEL STEL)	10 mg/m <sup>3</sup> w przeliczeniu na Mo
Regulatory reference	Dz. U. 2018 poz. 1286

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

molybdenum (7439-98-7)	
<b>Portugal - Occupational Exposure Limits</b>	
Local name	Molibdénio
OEL TWA	0.5 mg/m <sup>3</sup> Compostos solúveis, expresso em Mo. R (Fração respirável) 10 mg/m <sup>3</sup> Metal e compostos insolúveis, expresso em Mo. I (Fração inalável) 3 mg/m <sup>3</sup> 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
<b>Slovakia - Occupational Exposure Limits</b>	
Local name	Molybdén
NPHV (OEL TWA) [1]	5 mg/m <sup>3</sup> a jeho zlúčeniny rozpustné (ako Mo) 10 mg/m <sup>3</sup> a jeho zlúčeniny nerozpustné (ako Mo) inhalovateľná frakcia 5 mg/m <sup>3</sup> a jeho zlúčeniny nerozpustné (ako Mo) respirabilná frakcia
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (236/2020 Z. z.)
<b>Spain - Occupational Exposure Limits</b>	
Local name	Molibdeno elemental
VLA-ED (OEL TWA) [1]	10 mg/m <sup>3</sup> Fracción inhalable 3 mg/m <sup>3</sup> 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 2021. INSHT
<b>Sweden - Occupational Exposure Limits</b>	
Local name	Molybden, metall och svårlösliga. föreningar (som Mo)
NGV (OEL TWA)	10 mg/m <sup>3</sup> totaldamm 5 mg/m <sup>3</sup> 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, Arbetsmiljöverket, 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)
<b>United Kingdom - Occupational Exposure Limits</b>	
Local name	Molybdenum
WEL TWA (OEL TWA) [1]	10 mg/m <sup>3</sup> insoluble compounds (as Mo) 5 mg/m <sup>3</sup> soluble compounds (as Mo)
WEL STEL (OEL STEL)	20 mg/m <sup>3</sup> insoluble compounds (as Mo) 10 mg/m <sup>3</sup> soluble compounds (as Mo)
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
<b>Switzerland - Occupational Exposure Limits</b>	
Local name	Molybdène et ses composés insolubles / Molybdän und seine unlöslichen Verbindungen
MAK (OEL TWA) [1]	10 mg/m <sup>3</sup> (VME, inhalable dust)
Remark	NIOSH
Regulatory reference	www.suva.ch, 01.01.2021

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>molybdenum (7439-98-7)</b>	
<b>USA - ACGIH - Occupational Exposure Limits</b>	
Local name	Molybdenum, metal and insoluble compounds, as Mo
ACGIH OEL TWA	3 mg/m <sup>3</sup> (Respirable fraction) 10 mg/m <sup>3</sup> (Inhalable fraction)
Remark (ACGIH)	TLV® Basis: LRT irr
Regulatory reference	ACGIH 2021
<b>chromium (7440-47-3)</b>	
<b>EU - Indicative Occupational Exposure Limit (IOEL)</b>	
Local name	Chromium metal
IOEL TWA	2 mg/m <sup>3</sup>
Regulatory reference	COMMISSION DIRECTIVE 2006/15/EC
<b>Austria - Occupational Exposure Limits</b>	
Local name	Chrommetall, anorganische Chrom(II)- und anorganische Chrom(III)-Verbindungen (unlöslich)
MAK (OEL TWA)	2 mg/m <sup>3</sup>
Remark	Sh (für Cr(III)-Verbindungen)
Regulatory reference	BGBI. II Nr. 156/2021
<b>Belgium - Occupational Exposure Limits</b>	
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 <sup>3</sup>
Regulatory reference	Koninklijk besluit/Arrêté royal 19/11/2020
<b>Bulgaria - Occupational Exposure Limits</b>	
OEL TWA	2 mg/m <sup>3</sup>
<b>Croatia - Occupational Exposure Limits</b>	
Local name	Krom, metal (kao Cr)
GVI (OEL TWA) [1]	2 mg/m <sup>3</sup>
Regulatory reference	Pravilnik o izmjenama i dopunama Pravilnika o graničnim vrijednostima izloženosti opasnim tvarima pri radu i o biološkim graničnim vrijednostima (NN 1/2021)
<b>Croatia - Biological limit values</b>	
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 izmjenama i dopunama Pravilnika o graničnim vrijednostima izloženosti opasnim tvarima pri radu i o biološkim graničnim vrijednostima (NN 91/2018)
<b>Cyprus - Occupational Exposure Limits</b>	
OEL TWA	2 mg/m <sup>3</sup>
<b>Czech Republic - Occupational Exposure Limits</b>	
Local name	Prach z chromu
PEL (OEL TWA)	0.5 mg/m <sup>3</sup> (dust)

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>chromium (7440-47-3)</b>	
Regulatory reference	Nariadení vlády č. 361/2007 Sb. (Předpis 195/2021 Sb.)
<b>Denmark - Occupational Exposure Limits</b>	
Local name	Chrom, pulver og opløselige chromi- og chromosalte
OEL TWA [1]	0.5 mg/m <sup>3</sup> (Grænseværdie (langvarig), powder)
Regulatory reference	BEK nr 1426 af 28. juni 2021
<b>Estonia - Occupational Exposure Limits</b>	
Local name	Kroom (metall) ja tema anorgaanilised ühendid, v.akroomhape ja kromaadid (arvutatud kroomile)
OEL TWA	2 mg/m <sup>3</sup>
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 17.10.2019, 2); Vabariigi Valitsuse 10. märtsi 2019. a määruse nr 84
<b>Finland - Occupational Exposure Limits</b>	
Local name	Kromi, metalli
HTP (OEL TWA) [1]	0.005 mg/m <sup>3</sup> (arvo-8h)
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveystiete)
<b>Finland - Biological limit values</b>	
Local name	Kromi-(VI) ja sen yhdisteet
BLV	0.2 µmol/l Parametri: Virtsan kromi - Näytteenottoajankohta: Työväiheen tai työvuoron päätyttyä työviikon tai altistumisjakson loputtua
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveystiete)
<b>France - Occupational Exposure Limits</b>	
Local name	Chrome (métal), composés de chrome inorganiques (II) et composés de chrome inorganiques (insolubles) (III)
VME (OEL TWA)	2 mg/m <sup>3</sup>
Remark	Valeurs réglementaires indicatives
Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 984, 2016)
<b>France - Biological limit values</b>	
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)
<b>Germany - Occupational Exposure Limits (TRGS 900)</b>	
Local name	Chrom und anorganische Chrom(II) und (III)-Verbindungen
AGW (OEL TWA) [1]	2 mg/m <sup>3</sup> (E)
Peak exposure limitation factor	1(I)
Remark	10 - Der Arbeitsplatzgrenzwert bezieht sich auf den Elementgehalt des entsprechenden Metalls; EU - Europäische Union (Von der EU wurde ein Luftgrenzwert festgelegt: Abweichungen bei Wert und Spitzenbegrenzung sind möglich)
Regulatory reference	TRGS900
<b>Gibraltar - Occupational Exposure Limits</b>	
OEL TWA	2 mg/m <sup>3</sup>

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

chromium (7440-47-3)	
<b>Greece - Occupational Exposure Limits</b>	
Local name	Χρώμιο (μεταλλικό)
OEL TWA	1 mg/m <sup>3</sup>
Regulatory reference	Π.Δ. 90/1999 - Προστασία της υγείας των εργαζομένων που εκτίθενται σε ορισμένους χημικούς παράγοντες κατά τη διάρκεια της εργασίας τους
<b>Hungary - Occupational Exposure Limits</b>	
Local name	KRÓM (fém), SZERVETLEN KRÓM (II) és KRÓM (III) VEGYÜLETEK (nem oldható)
AK (OEL TWA)	2 mg/m <sup>3</sup>
OEL chemical category	Sensitizer
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
<b>Hungary - Biological Exposure Indices</b>	
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
<b>Ireland - Occupational Exposure Limits</b>	
Local name	Chromium metal
OEL TWA [1]	2 mg/m <sup>3</sup> (8h ref)
OEL STEL	6 mg/m <sup>3</sup> (calculated, 15 min ref)
Regulatory reference	Chemical Agents Code of Practice 2021
<b>Ireland - Biological limit values</b>	
Local name	Chromium VI and water soluble compounds
BLV	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)
<b>Italy - Occupational Exposure Limits</b>	
OEL TWA	0.5 mg/m <sup>3</sup>
<b>Latvia - Occupational Exposure Limits</b>	
OEL TWA	2 mg/m <sup>3</sup> (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)
<b>Latvia - Biological Exposure Indices</b>	
BEI	10 µg/g creatinine
<b>Lithuania - Occupational Exposure Limits</b>	
IPRV (OEL TWA)	2 mg/m <sup>3</sup>
<b>Luxembourg - Occupational Exposure Limits</b>	
OEL TWA	2 mg/m <sup>3</sup>

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

chromium (7440-47-3)	
<b>Malta - Occupational Exposure Limits</b>	
OEL TWA	2 mg/m <sup>3</sup>
<b>Netherlands - Occupational Exposure Limits</b>	
Local name	Chroom
TGG-8u (OEL TWA)	0.5 mg/m <sup>3</sup>
Regulatory reference	Arbeidsomstandighedenregeling 2021
<b>Poland - Occupational Exposure Limits</b>	
Local name	Chrom metaliczny
NDS (OEL TWA)	0.5 mg/m <sup>3</sup>
Regulatory reference	Dz. U. 2018 poz. 1286
<b>Portugal - Occupational Exposure Limits</b>	
Local name	Crómio metal e compostos de crómio (III), expressos em Cr
OEL TWA	2 mg/m <sup>3</sup> (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
<b>Romania - Occupational Exposure Limits</b>	
OEL TWA	0.5 mg/m <sup>3</sup> (Metallurgy) 2 mg/m <sup>3</sup> (metal)
OEL chemical category	Carcinogen Metallurgy
<b>Romania - Biological limit values</b>	
BLV	10 µg/g creatinine
<b>Slovakia - Occupational Exposure Limits</b>	
Local name	Chróm anorg. zlúč. chrómu (II) a (III) – nerozpustné (ako Cr)
NPHV (OEL TWA) [1]	2 mg/m <sup>3</sup>
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (236/2020 Z. z.)
<b>Slovenia - Occupational Exposure Limits</b>	
Local name	krom – kovinski, anorganske kromove (II) spojine in anorganske kromove (III) spojine (netopne)
OEL TWA	2 mg/m <sup>3</sup>
OEL STEL	2 mg/m <sup>3</sup>
Remark	EU
Regulatory reference	Uradni list RS, št. 72/2021 z dne 11.5.2021
<b>Spain - Occupational Exposure Limits</b>	
Local name	Cromo metal
VLA-ED (OEL TWA) [1]	2 mg/m <sup>3</sup>
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 2021. INSHT
<b>Sweden - Occupational Exposure Limits</b>	
Local name	Krom, och oorg. (II, III)-föreningar (som Cr)



# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>chromium (7440-47-3)</b>	
NGV (OEL TWA)	0.5 mg/m <sup>3</sup> (total dust / totalt damm)
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
<b>United Kingdom - Occupational Exposure Limits</b>	
Local name	Chromium
WEL TWA (OEL TWA) [1]	0.5 mg/m <sup>3</sup>
WEL STEL (OEL STEL)	1.5 mg/m <sup>3</sup> (calculated)
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
<b>United Kingdom - Biological limit values</b>	
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
<b>Norway - Occupational Exposure Limits</b>	
Grenseverdi (OEL TWA) [1]	0.5 mg/m <sup>3</sup>
Korttidsverdi (OEL STEL)	0.5 mg/m <sup>3</sup>
<b>Switzerland - Occupational Exposure Limits</b>	
Local name	Chrome (métal) / Chrom (Metall)
MAK (OEL TWA) [1]	0.5 mg/m <sup>3</sup> (VME, inhalable dust)
Critical toxicity	VRS, Peau / OAW, Haut
Notation	S / S
Remark	HSE, NIOSH
OEL chemical category	Sensitizer
Regulatory reference	www.suva.ch, 01.01.2021
<b>Switzerland - BAT</b>	
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; Probennahmezeitpunkt: 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
<b>USA - ACGIH - Occupational Exposure Limits</b>	
Local name	Metallic chromium, as Cr(0)
ACGIH OEL TWA	0.5 mg/m <sup>3</sup> (Inhalable fraction)
Remark (ACGIH)	TLV® Basis: Resp tract irr
Regulatory reference	ACGIH 2021
<b>USA - ACGIH - Biological Exposure Indices</b>	
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 2021

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>manganese, powder (7439-96-5)</b>	
<b>EU - Indicative Occupational Exposure Limit (IOEL)</b>	
Local name	Manganese
IOEL TWA	0.2 mg/m <sup>3</sup> (Inhalable fraction) 0.05 mg/m <sup>3</sup> (Respirable fraction)
Remark	(Year of adoption 2011)
Regulatory reference	SCOEL Recommendations
<b>Austria - Occupational Exposure Limits</b>	
Local name	Mangan und seine anorganischen Verbindungen: Mangan
MAK (OEL TWA)	0.2 mg/m <sup>3</sup> (als Mn berechnet, E) 0.05 mg/m <sup>3</sup> (als Mn berechnet, A)
MAK (OEL STEL)	1.6 mg/m <sup>3</sup> (als Mn berechnet, E, 4x 15(Miw) min) 0.16 mg/m <sup>3</sup> (als Mn berechnet, A, 4x 15(Miw) min)
Regulatory reference	BGBI. II Nr. 156/2021
<b>Austria - Biological limit values</b>	
Local name	Mangan
BLV	20 µg/l Parameter: Mangan - Untersuchungsmaterial: Blut
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)
<b>Belgium - Occupational Exposure Limits</b>	
Local name	Manganèse et ses composés (en Mn) # Mangaan, en -verbindingen (als Mn)
OEL TWA	0.2 mg/m <sup>3</sup>
Regulatory reference	Koninklijk besluit/Arrêté royal 19/11/2020
<b>Croatia - Occupational Exposure Limits</b>	
Local name	Mangan i anorganski spojevi mangana (kao Mn)
GVI (OEL TWA) [1]	0.2 mg/m <sup>3</sup> U (ukupna prašina) 0.05 mg/m <sup>3</sup> R (respirabilna prašina)
Remark	Direktiva: 2017/164/EU
Regulatory reference	Pravilnik o izmjenama i dopunama Pravilnika o graničnim vrijednostima izloženosti opasnim tvarima pri radu i o biološkim graničnim vrijednostima (NN 1/2021)
<b>Czech Republic - Occupational Exposure Limits</b>	
Local name	Mangan a jeho anorganické sloučeniny, jako Mn
PEL (OEL TWA)	0.2 mg/m <sup>3</sup> (V) 0.05 mg/m <sup>3</sup> (R)

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>manganese, powder (7439-96-5)</b>	
NPK-P (OEL C)	0.4 mg/m <sup>3</sup> (V) 0.1 mg/m <sup>3</sup> (R)
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 195/2021 Sb.)
<b>Denmark - Occupational Exposure Limits</b>	
Local name	Mangan, pulver, støv og uorganiske forbindelser
OEL TWA [1]	0.2 mg/m <sup>3</sup> inhalerbar, beregnet som Mn 0.05 mg/m <sup>3</sup> respirabel, beregnet som Mn
Regulatory reference	BEK nr 1426 af 28. juni 2021
<b>Estonia - Occupational Exposure Limits</b>	
Local name	Mangaan ja anorgaanilised ühendid (arvutatud mangaanile)
OEL TWA	0.2 mg/m <sup>3</sup> kogu tolm 0.05 mg/m <sup>3</sup> 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, 17.10.2019, 2); Vabariigi Valitsuse 10. märtsi 2019. a määruse nr 84
<b>Finland - Occupational Exposure Limits</b>	
Local name	Mangaani, metalli
HTP (OEL TWA) [1]	0.02 mg/m <sup>3</sup> Mn, alveolijae
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveystieteiden ministeriö)
<b>France - Occupational Exposure Limits</b>	
VME (OEL TWA)	1 mg/m <sup>3</sup>
<b>Germany - Occupational Exposure Limits (TRGS 900)</b>	
Local name	Mangan und seine anorganischen Verbindungen
AGW (OEL TWA) [1]	0.02 mg/m <sup>3</sup> (A) 0.2 mg/m <sup>3</sup> (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)
Regulatory reference	TRGS900
<b>Hungary - Occupational Exposure Limits</b>	
Local name	MANGÁN ÉS SZERVETLEN SÓI (Mn-ra számítva)
AK (OEL TWA)	0.2 mg/m <sup>3</sup> 0.05 mg/m <sup>3</sup> respirábilis frakció
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
<b>Ireland - Occupational Exposure Limits</b>	
Local name	Manganese, fume (as Mn)
OEL TWA [1]	0.2 mg/m <sup>3</sup> I (Inhalable Fraction) 0.02 mg/m <sup>3</sup> R (Respirable Fraction)

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>manganese, powder (7439-96-5)</b>	
OEL STEL	3 mg/m <sup>3</sup>
Regulatory reference	Chemical Agents Code of Practice 2021
<b>Latvia - Occupational Exposure Limits</b>	
Local name	Mangāns metināšanas aerosolos (kondensācijas aerosols)
OEL TWA	0.1 mg/m <sup>3</sup>
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2011. gada 1. februārī noteikumiem Nr. 92)
<b>Netherlands - Occupational Exposure Limits</b>	
Local name	Mangaan en anorganische mangaan-verbindingen
TGG-8u (OEL TWA)	0.05 mg/m <sup>3</sup> (respirabel) 0.2 mg/m <sup>3</sup> (inhaleerbaar)
TGG-15min (OEL STEL)	0.05 mg/m <sup>3</sup> Respirabel (als mangaan)
Regulatory reference	Arbeidsomstandighedenregeling 2021
<b>Poland - Occupational Exposure Limits</b>	
Local name	Mangan i jego związki nieorganiczne
NDS (OEL TWA)	0.2 mg/m <sup>3</sup> w przeliczeniu na Mn: frakcja wdychalna 0.05 mg/m <sup>3</sup> w przeliczeniu na Mn: frakcja respirabilna
Regulatory reference	Dz. U. 2018 poz. 1286
<b>Portugal - Occupational Exposure Limits</b>	
Local name	Manganês e compostos inorgânicos, expressos em Mn
OEL TWA	0.1 mg/m <sup>3</sup> I (Fração inalável) 0.02 mg/m <sup>3</sup> R (Fração respirável)
Remark	A4 (Agente não classificável como carcinogénico no Homem)
Regulatory reference	Norma Portuguesa NP 1796:2014
<b>Slovakia - Occupational Exposure Limits</b>	
Local name	Mangán a jeho anorganické zlúčeniny (ako mangán)
NPHV (OEL TWA) [1]	0.2 mg/m <sup>3</sup> inhalovateľná frakcia 0.05 mg/m <sup>3</sup> respirabilná frakcia
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (236/2020 Z. z.)
<b>Slovenia - Occupational Exposure Limits</b>	
Local name	mangan in anorganske manganove spojine (računano kot Mg)
OEL TWA	0.2 mg/m <sup>3</sup> 0.05 mg/m <sup>3</sup>
OEL STEL	1.6 mg/m <sup>3</sup> 0.4 mg/m <sup>3</sup>
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
<b>Spain - Occupational Exposure Limits</b>	
Local name	Manganeso elemental
VLA-ED (OEL TWA) [1]	0.2 mg/m <sup>3</sup> Fracción inhalable 0.05 mg/m <sup>3</sup> Fracción respirable

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>manganese, powder (7439-96-5)</b>	
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 2021. INSHT
<b>Sweden - Occupational Exposure Limits</b>	
Local name	Mangan, och oorg. föreningar (som Mn)
NGV (OEL TWA)	0.2 mg/m <sup>3</sup> inhalerbar fraktion 0.05 mg/m <sup>3</sup> respirabel fraktion
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
<b>United Kingdom - Occupational Exposure Limits</b>	
WEL TWA (OEL TWA) [1]	0.2 mg/m <sup>3</sup> 0.05 mg/m <sup>3</sup>
<b>Norway - Occupational Exposure Limits</b>	
Local name	Mangan og uorganiske manganforb. (beregnet som Mn)
Grenseverdi (OEL TWA) [1]	0.2 mg/m <sup>3</sup> Inhalerbar fraksjon 0.05 mg/m <sup>3</sup> Respirabel fraksjon
Regulatory reference	FOR-2021-06-28-2248
<b>Switzerland - Occupational Exposure Limits</b>	
Local name	Manganèse et ses composés inorg. / Mangan und seine anorganischen Verbindungen
MAK (OEL TWA) [1]	0.5 mg/m <sup>3</sup> (i) / (e)
Critical toxicity	SNC / ZNS
Notation	SS <sub>C</sub> , B, P / SS <sub>C</sub> , B, P
Remark	NIOSH
Regulatory reference	www.suva.ch, 01.01.2021
<b>Switzerland - BAT</b>	
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
<b>USA - ACGIH - Occupational Exposure Limits</b>	
Local name	Manganese, elemental and inorganic compounds, as Mn
ACGIH OEL TWA	0.02 mg/m <sup>3</sup> (Respirable fraction) 0.1 mg/m <sup>3</sup> (Inhalable fraction)
Remark (ACGIH)	TLV® Basis: CNS impair. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH 2021
<b>silicon, powder, amorphous (7440-21-3)</b>	
<b>Belgium - Occupational Exposure Limits</b>	
Local name	Silicium # Silicium

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

silicon, powder, amorphous (7440-21-3)	
OEL TWA	10 mg/m <sup>3</sup>
Regulatory reference	Koninklijk besluit/Arrêté royal 19/11/2020
<b>Croatia - Occupational Exposure Limits</b>	
Local name	Silicij
GVI (OEL TWA) [1]	10 mg/m <sup>3</sup> U (ukupna prašina) 4 mg/m <sup>3</sup> R (respirabilna prašina)
Regulatory reference	Pravilnik o izmjenama i dopunama Pravilnika o graničnim vrijednostima izloženosti opasnim tvarima pri radu i o biološkim graničnim vrijednostima (NN 1/2021)
<b>Denmark - Occupational Exposure Limits</b>	
Local name	Silicium
OEL TWA [1]	10 mg/m <sup>3</sup>
Regulatory reference	BEK nr 1426 af 28. juni 2021
<b>Estonia - Occupational Exposure Limits</b>	
Local name	Silikoon
OEL TWA	10 mg/m <sup>3</sup> 5 mg/m <sup>3</sup> 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, 17.10.2019, 2); Vabariigi Valitsuse 10. märtsi 2019. a määruse nr 84
<b>France - Occupational Exposure Limits</b>	
Local name	Silicium
VME (OEL TWA)	10 mg/m <sup>3</sup>
Remark	Valeurs recommandées/admises
Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 984, 2016)
<b>Greece - Occupational Exposure Limits</b>	
Local name	Πυρίτιο
OEL TWA	10 mg/m <sup>3</sup> εισπν. 5 mg/m <sup>3</sup> αναπν.
Regulatory reference	Π.Δ. 90/1999 - Προστασία της υγείας των εργαζομένων που εκτίθενται σε ορισμένους χημικούς παράγοντες κατά τη διάρκεια της εργασίας τους
<b>Ireland - Occupational Exposure Limits</b>	
Local name	Silicon Si
OEL TWA [1]	10 mg/m <sup>3</sup> total inhalable dust 4 mg/m <sup>3</sup> respirable dust
Regulatory reference	Chemical Agents Code of Practice 2021
<b>Slovakia - Occupational Exposure Limits</b>	
Local name	Silikón
NPHV (OEL TWA) [1]	10 mg/m <sup>3</sup> inhalovateľná frakcia 4 mg/m <sup>3</sup> respirabilná frakcia
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (236/2020 Z. z.)

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

silicon, powder, amorphous (7440-21-3)	
<b>United Kingdom - Occupational Exposure Limits</b>	
Local name	Silicon
WEL TWA (OEL TWA) [1]	10 mg/m <sup>3</sup> 4 mg/m <sup>3</sup>
Remark	WEL TWA: 10 mg/m <sup>3</sup> (inhalable aerosol); 4 mg/m <sup>3</sup> (respirable aerosol)
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
<b>Norway - Occupational Exposure Limits</b>	
Local name	Silisium
Grenseverdi (OEL TWA) [1]	10 mg/m <sup>3</sup>
Regulatory reference	FOR-2021-06-28-2248
<b>Switzerland - Occupational Exposure Limits</b>	
Local name	Silicium / Silicium
MAK (OEL TWA) [1]	3 mg/m <sup>3</sup> (a) / (a)
Remark	NIOSH
Regulatory reference	www.suva.ch, 01.01.2021

### 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



# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

### 8.2.2.3. Respiratory protection

#### Respiratory protection:

[In case of inadequate ventilation] wear respiratory protection. 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/flamm resistant/retardant clothing.

### 8.2.3. Environmental exposure controls

#### Environmental exposure controls:

Avoid release to the environment. 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.

#### 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.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Physical state	: Solid
Appearance	: Metal powder.
Colour	: Grey.
Odour	: Odourless.
Odour threshold	: No data available
pH	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: ≈ 1415 °C
Freezing point	: Not applicable
Boiling point	: ≈ 2800 °C
Flash point	: Not applicable
Auto-ignition temperature	: Not applicable
Decomposition temperature	: No data available
Flammability (solid, gas)	: Non flammable.
Vapour pressure	: No data available
Relative vapour density at 20 °C	: No data available
Relative density	: No data available
Density	: ≈ 8.2 g/cm <sup>3</sup>
Solubility	: No data available
Partition coefficient n-octanol/water (Log Pow)	: No data available
Viscosity, kinematic	: Not applicable
Viscosity, dynamic	: No data available
Explosive properties	: Fine dust clouds may form explosive mixtures with air. Risk of explosion if heated under confinement.
Oxidising properties	: No data available
Explosive limits	: Not applicable

### 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

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

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

### 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).

### 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 toxicological effects

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)
LC50 Inhalation - Rat	> 250 mg/m <sup>3</sup> air (6 h, Rat, Male, Experimental value, Inhalation (dust))

#### cobalt (7440-48-4)

LD50 oral rat	550 mg/kg bodyweight (OECD 425: Acute Oral Toxicity: Up-and-Down Procedure, Rat, Female, Experimental value, Oral, 14 day(s))
LD50 dermal rat	> 2000 mg/kg bodyweight (OECD 402: Acute Dermal Toxicity, 24 h, Rat, Male / female, Experimental value, Dermal, 15 day(s))
LC50 Inhalation - Rat	≤ 0.05 mg/l (OECD 436: Acute inhalation toxicity-acute toxic class method, 4 h, Rat, Male / female, Experimental value, Inhalation (dust), 14 day(s))
LC50 Inhalation - Rat (Dust/Mist)	≤ 0.05 mg/l Source: ECHA

#### titanium, powder, dry, slightly self-heating (7440-32-6)

LD50 oral rat	> 5000 mg/kg bodyweight Animal: rat, Animal sex: female, Guideline: OECD Guideline 425 (Acute Oral Toxicity: Up-and-Down Procedure), Guideline: EPA OPPTS 870.1100 (Acute Oral Toxicity)
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#### 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))
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#### 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

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>chromium (7440-47-3)</b>	
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
<b>manganese, powder (7439-96-5)</b>	
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
<b>silicon, powder, amorphous (7440-21-3)</b>	
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
Skin corrosion/irritation	: Not classified
Serious eye damage/irritation	: Not classified
Respiratory or skin sensitisation	: May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction.
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Suspected of causing cancer.
<b>cobalt (7440-48-4)</b>	
IARC group	2B - Possibly carcinogenic to humans, 2A - Probably carcinogenic to humans
<b>nickel, powder, particle diameter &lt; 1 mm (7440-02-0)</b>	
IARC group	2B - Possibly carcinogenic to humans
<b>chromium (7440-47-3)</b>	
IARC group	3 - Not classifiable
Reproductive toxicity	: Not classified
<b>silicon, powder, amorphous (7440-21-3)</b>	
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)
STOT-single exposure	: Not classified
STOT-repeated exposure	: Causes damage to organs through prolonged or repeated exposure.
<b>cobalt (7440-48-4)</b>	
LOAEC (inhalation, rat,dust/mist/fume, 90 days)	0.31 mg/l air Animal: rat
NOAEL (oral, rat, 90 days)	3 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 408 (Repeated Dose 90-Day Oral Toxicity Study in Rodents)
<b>nickel, powder, particle diameter &lt; 1 mm (7440-02-0)</b>	
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).

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>molybdenum (7439-98-7)</b>	
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)
<b>chromium (7440-47-3)</b>	
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)
<b>silicon, powder, amorphous (7440-21-3)</b>	
NOAEL (oral, rat, 90 days)	> 5000 mg/kg bodyweight Animal: rat, Animal sex: male
Aspiration hazard	: Not classified
<b>GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)</b>	
Viscosity, kinematic	Not applicable

## SECTION 12: Ecological information

### 12.1. Toxicity

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

<b>iron, powder (7439-89-6)</b>	
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
<b>cobalt (7440-48-4)</b>	
LC50 - Fish [1]	100 mg/l Source: ECHA
EC50 - Crustacea [1]	> 890 µg/l Test organisms (species): Daphnia magna
EC50 - Crustacea [2]	5.89 mg/l Test organisms (species): Daphnia magna
<b>titanium, powder, dry, slightly self-heating (7440-32-6)</b>	
EC50 72h - Algae [1]	> 10000 mg/l Test organisms (species): Skeletonema costatum
<b>nickel, powder, particle diameter &lt; 1 mm (7440-02-0)</b>	
LC50 - Fish [1]	15.3 mg/l (96 h, Oncorhynchus mykiss, Semi-static system, Fresh water, Experimental value, Lethal)
EC50 72h - Algae [1]	81.5 – 148 µg/l (OECD 201: Alga, Growth Inhibition Test, Pseudokirchneriella subcapitata, Static system, Fresh water, Experimental value, Growth rate)
<b>molybdenum (7439-98-7)</b>	
LC50 - Fish [1]	0.79 mg/l (672 h, Salmo gairdneri)
EC50 72h - Algae [1]	289.2 mg/l Source: ECHA

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>chromium (7440-47-3)</b>	
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
<b>manganese, powder (7439-96-5)</b>	
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'
<b>silicon, powder, amorphous (7440-21-3)</b>	
EC50 72h - Algae [1]	≈ 250 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)
<b>12.2. Persistence and degradability</b>	
<b>iron, powder (7439-89-6)</b>	
Persistence and degradability	Biodegradability in soil: not applicable. Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable
BOD (% of ThOD)	Not applicable
<b>cobalt (7440-48-4)</b>	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)
<b>titanium, powder, dry, slightly self-heating (7440-32-6)</b>	
Persistence and degradability	Biodegradability in soil: not applicable. Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable
BOD (% of ThOD)	Not applicable
<b>nickel, powder, particle diameter &lt; 1 mm (7440-02-0)</b>	
Persistence and degradability	Biodegradability in soil: not applicable. Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)
<b>molybdenum (7439-98-7)</b>	
Persistence and degradability	Biodegradability: not applicable.

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>molybdenum (7439-98-7)</b>	
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable
BOD (% of ThOD)	Not applicable
<b>chromium (7440-47-3)</b>	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)
<b>manganese, powder (7439-96-5)</b>	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)
<b>silicon, powder, amorphous (7440-21-3)</b>	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable
BOD (% of ThOD)	Not applicable
<b>12.3. Bioaccumulative potential</b>	
<b>iron, powder (7439-89-6)</b>	
Bioaccumulative potential	No bioaccumulation data available.
<b>cobalt (7440-48-4)</b>	
BCF - Fish [1]	< 10 (Pisces, Fresh water, Literature study)
BCF - Other aquatic organisms [1]	< 300 (Invertebrata, Literature study)
Bioaccumulative potential	Low potential for bioaccumulation (BCF < 500).
<b>titanium, powder, dry, slightly self-heating (7440-32-6)</b>	
Bioaccumulative potential	No bioaccumulation data available.
<b>nickel, powder, particle diameter &lt; 1 mm (7440-02-0)</b>	
BCF - Fish [1]	47 – 106 (30 day(s), Pimephales promelas, Flow-through system, Fresh water, Experimental value)
BCF - Other aquatic organisms [1]	1555 (Myrriophyllum sp., Fresh water, Experimental value, Nickel ion)
Partition coefficient n-octanol/water (Log Pow)	-0.57 (Estimated value)
Bioaccumulative potential	Low potential for bioaccumulation (BCF < 500).
<b>molybdenum (7439-98-7)</b>	
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.
<b>chromium (7440-47-3)</b>	
BCF - Fish [1]	0.0048 (Pisces, Literature study, Dry weight)
Partition coefficient n-octanol/water (Log Pow)	0.23 Source: SRC

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

<b>chromium (7440-47-3)</b>	
Bioaccumulative potential	Not bioaccumulative.
<b>manganese, powder (7439-96-5)</b>	
BCF - Fish [1]	81 (Pisces)
BCF - Other aquatic organisms [1]	300000 (Mollusca)
BCF - Other aquatic organisms [2]	125000 (Crustacea)
Bioaccumulative potential	Not bioaccumulative.

### 12.4. Mobility in soil

<b>iron, powder (7439-89-6)</b>	
Surface tension	Not applicable (solid)
Ecology - soil	Adsorbs into the soil.

<b>cobalt (7440-48-4)</b>	
Surface tension	No data available in the literature
Ecology - soil	No (test)data on mobility of the substance available.

<b>titanium, powder, dry, slightly self-heating (7440-32-6)</b>	
Mobility in soil	1.582
Ecology - soil	Adsorbs into the soil.

<b>nickel, powder, particle diameter &lt; 1 mm (7440-02-0)</b>	
Surface tension	No data available (test not performed)
Ecology - soil	Adsorbs into the soil.

<b>molybdenum (7439-98-7)</b>	
Ecology - soil	Adsorbs into the soil.

<b>chromium (7440-47-3)</b>	
Surface tension	No data available (test not performed)
Ecology - soil	No (test)data on mobility of the substance available.

<b>manganese, powder (7439-96-5)</b>	
Ecology - soil	Adsorbs into the soil.

<b>silicon, powder, amorphous (7440-21-3)</b>	
Surface tension	0.74 N/m (1410 °C)

### 12.5. Results of PBT and vPvB assessment

<b>Component</b>	
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
cobalt (7440-48-4)	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

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

Component	
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

### 12.6. 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.
Product/Packaging disposal recommendations	: 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. Do not discharge into drains or the environment. Dispose of at authorized waste collection point. Disposal must be done according to official regulations.
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
<b>14.1. UN number</b>				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
<b>14.2. UN proper shipping name</b>				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
<b>14.3. Transport hazard class(es)</b>				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
<b>14.4. Packing group</b>				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
<b>14.5. Environmental hazards</b>				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
No supplementary information available				

### 14.6. Special precautions for user

#### Overland transport

Not regulated

#### Transport by sea

Not regulated

#### Air transport

Not regulated



# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

### Inland waterway transport

Not regulated

### Rail transport

Not regulated

### 14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

## SECTION 15: Regulatory information

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

#### 15.1.1. EU-Regulations

EU restriction list (REACH Annex XVII)		
Reference code	Applicable on	Entry title or description
27.	GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS) ; nickel, powder, particle diameter < 1 mm	Nickel and its compounds

Contains no substance on the REACH candidate list

Contains no REACH Annex XIV substances

Contains no substance subject to Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals.

Contains no substance subject to Regulation (EU) No 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants

Contains no substance subject to Regulation (EU) 2019/1148 of the European Parliament and of the Council of 20 June 2019 on the marketing and use of explosives precursors.

#### 15.1.2. National regulations

France	
Occupational diseases	
Code	Description
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
RG 65	Eczematiform lesions of allergic mechanism
RG 70	Occupational diseases caused by cobalt and its compounds
RG 70 BIS	Respiratory disorders due to sintered or fused metal carbide dust containing cobalt
RG 70 TER	Primary broncho-pulmonary cancer caused by inhalation of cobalt dust associated with tungsten carbide prior to sintering

#### 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)

Hazardous Incident Ordinance (12. BImSchV) : Is not subject of the Hazardous Incident Ordinance (12. BImSchV)

#### Netherlands

ABM category : C(2) - low hazard for aquatic organisms occurs naturally in surface water

SZW-lijst van kankerverwekkende stoffen : cobalt is listed

SZW-lijst van mutagene stoffen : None of the components are listed

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

SZW-lijst van reprotoxische stoffen – Borstvoeding : None of the components are listed  
SZW-lijst van reprotoxische stoffen – Vruchtbaarheid : cobalt,manganese, powder are 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

## 15.2. Chemical safety assessment

No chemical safety assessment has been carried out

## SECTION 16: Other information

Abbreviations and acronyms:	
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
BLV	Biological limit value
CAS-No.	Chemical Abstract Service number
CLP	Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
DMEL	Derived Minimal Effect level
DNEL	Derived-No Effect Level
EC50	Median effective concentration
EC-No.	European Community number
EN	European Standard
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
NOAEL	No-Observed Adverse Effect Level
NOEC	No-Observed Effect Concentration
OEL	Occupational Exposure Limit
PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
SDS	Safety Data Sheet
vPvB	Very Persistent and Very Bioaccumulative

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

### Abbreviations and acronyms:

WGK	Water Hazard Class
BCF	Bioconcentration factor
BOD	Biochemical oxygen demand (BOD)
COD	Chemical oxygen demand (COD)
IARC	International Agency for Research on Cancer
OECD	Organisation for Economic Co-operation and Development
STP	Sewage treatment plant
ThOD	Theoretical oxygen demand (ThOD)
TLM	Median Tolerance Limit
VOC	Volatile Organic Compounds
N.O.S.	Not Otherwise Specified
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:

Aquatic Chronic 3	Hazardous to the aquatic environment — Chronic Hazard, Category 3
Aquatic Chronic 4	Hazardous to the aquatic environment — Chronic Hazard, Category 4
Carc. 1B	Carcinogenicity, Category 1B
Carc. 2	Carcinogenicity, Category 2
Flam. Sol. 1	Flammable solids, Category 1
Flam. Sol. 2	Flammable solids, Category 2
H228	Flammable solid.
H317	May cause an allergic skin reaction.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H351	Suspected of causing cancer.
H360F	May damage fertility.
H372	Causes damage to organs through prolonged or repeated exposure.
H412	Harmful to aquatic life with long lasting effects.
H413	May cause long lasting harmful effects to aquatic life.
Muta. 2	Germ cell mutagenicity, Category 2
Repr. 1B	Reproductive toxicity, Category 1B
Resp. Sens. 1	Respiratory sensitisation, Category 1
Skin Sens. 1	Skin sensitisation, Category 1
STOT RE 1	Specific target organ toxicity — Repeated exposure, Category 1

# GE+ M300, Maraging Steel 300 DMLM powder (CL 50WS)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH)

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The classification complies with : ATP 12

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.