



N5000 Copper Clad Laminate

Safety Data Sheet

US-SDS according to the federal final rule of hazard communication revised on 2024 (HazCom 2024)
Issue date: May 27 2015 Revision date: Feb. 1 2026

SECTION 1: Identification

1.1. Identification

Product form : Mixture
Product name : N5000 Copper Clad Laminate
Other means of identification : N5000 Fiberglass Copper Clad Laminate

1.2. Recommended use and restrictions on use

Use of the substance/mixture : Laminate for consumer and industrial electronics.
Restrictions on use : Consumer uses, Food and feed area, Drinking water, Skin contact

1.3. Supplier

AGC Multi Material America Inc.
1420 W 12th Place
Tempe, AZ 85281, USA
T +1-480-967-5600

AGC Multi Material Singapore Pte. Ltd.
4 Gul Crescent
Jurong, Singapore 629520
T +65-6861-7117

AGC Multi Material Europe SASU
25 Rue du Lyonnais
69800 Saint-Priest, France
T +33-6-15-75-21-53

1.4. Emergency telephone number

Emergency number :
AGC Multi Material America Inc. : +1-480-967-5600 (9am - 5pm MST) M - F
AGC Multi Material Singapore Pte. Ltd. : +65-6861-7117 (9am - 5pm SST) M - F
AGC Multi Material Europe SASU : +33-6-15-75-21-53 (9am - 5pm CET) M - F

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification

Not classified

2.2. GHS Label elements, including precautionary statements

GHS US labeling

No labeling applicable

2.3. Other hazards which do not result in classification

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	Conc. (% w/w)
Copper	CAS-No.: 7440-50-8	30 – 70
Glass, oxide, chemicals	CAS-No.: 65997-17-3	15 – 35
butanone, ethyl methyl ketone	CAS-No.: 78-93-3	< 0.1

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Name	Product identifier	Conc. (% w/w)
Dimethylformamide	CAS-No.: 68-12-2	< 0.1
acetone, propan-2-one, propanone	CAS-No.: 67-64-1	< 0.1

The specific chemical component identities and/or the exact component percentages of this material may be withheld as trade secrets. This information is made available to health professionals, employees, and designated representatives in accordance with the applicable provisions of 29 CFR 1910.1200 (I)(1). Trace ingredients (if any) are present in < 1% concentration, (< 0.1% for potential carcinogens, mutagen, and reproductive toxicant, respiratory tract and skin sensitizers in addition to oral/ inhalation acute toxicant in category 1 and 2). None of the trace ingredients contribute significant additional hazards at the concentrations that may be present in this product. All pertinent hazard information has been provided in this document, per the requirements of the Federal Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalents.

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general	: If you feel unwell, seek medical advice.
First-aid measures after inhalation	: Remove person to fresh air and keep comfortable for breathing.
First-aid measures after skin contact	: Wash skin with plenty of water.
First-aid measures after eye contact	: Rinse eyes with water as a precaution.
First-aid measures after ingestion	: Call a poison center/doctor/physician if you feel unwell.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after inhalation	: None under normal conditions. Dust of the product, if present, may cause respiratory irritation after an excessive inhalation exposure.
Symptoms/effects after skin contact	: None under normal conditions. Dust may cause irritation in skin folds or by contact in combination with tight clothing.
Symptoms/effects after eye contact	: None under normal conditions. Dust from this product may cause eye irritation.
Symptoms/effects after ingestion	: None under normal conditions.

4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media	: Adapt extinguishing media to the environment for surrounding fires.
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5.2. Specific hazards arising from the chemical

Fire hazard	: No fire hazard.
Explosion hazard	: No direct explosion hazard.
Hazardous decomposition products in case of fire	: Toxic fumes may be released.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions	: Fight fire from safe distance and protected location. Do not enter fire area without proper protective equipment, including respiratory protection.
Protection during firefighting	: Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures	: Notify authorities if product enters sewers or public waters. Absorb spillage to prevent material-damage.
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6.1.1. For non-emergency personnel

Protective equipment : Wear recommended personal protective equipment.
Emergency procedures : Ventilate spillage area.

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".
Emergency procedures : Evacuate unnecessary personnel.

6.2. Environmental precautions

Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Mechanically recover the product.
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.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Not expected to present a significant hazard under anticipated conditions of normal use.
Precautions for safe handling : Ensure good ventilation of the work station. Wear personal protective equipment.
Hygiene measures : Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Keep in a cool, well-ventilated place away from heat.
Storage conditions : Keep cool. Protect from sunlight.
Packaging materials : Store always product in container of same material as original container.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Australia

Copper (7440-50-8)	
Australia - Occupational Exposure Limits	
Local name	Copper
OES TWA	0.2 mg/m ³ fume 1 mg/m ³ dusts & mists (as Cu)
Regulatory reference	Workplace exposure standards for airborne contaminants (2024)

Canada

Glass, oxide, chemicals (65997-17-3)	
Canada (Alberta) - Occupational Exposure Limits	
Local name	Synthetic Vitreous Fibres: Glass Fibres Continuous filament
OEL TWA	1 fibers/cm ³ 5 mg/m ³ Total

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Glass, oxide, chemicals (65997-17-3)	
Notations and remarks	Occupational exposure limit is based on irritation effects and its adjustment to compensate for unusual work schedules is not required.
Regulatory reference	Alberta Regulation 87/2009 (Alberta Regulation 150/2020)
Canada (Quebec) - Occupational Exposure Limits	
Local name	Fibres-artificial vitreous mineral fibres - Fibrous glass, continuous filament
VEMP (OEL TWAEV)	1 fibers/cm ³
Regulatory reference	S-2.1, r. 13 - Regulation respecting occupational health and safety
Canada (British Columbia) - Occupational Exposure Limits	
Local name	Synthetic Vitreous Fibres - Continuous filament glass fibres
OEL TWA	1 fibers/cm ³ 5 mg/m ³ Inhalable
Regulatory reference	OHS Guidelines Part 5: Chemical Agents and Biological Agents (WorkSafe BC)
Canada (Manitoba) - Occupational Exposure Limits	
Local name	Synthetic vitreous fibers - Continuous filament glass fibers
OEL TWA	5 mg/m ³ (I - Inhalable particulate matter) 1 fibers/cm ³ (F - Respirable fibers)
Notations and remarks	TLV® Basis: URT irr. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH
Canada (Newfoundland and Labrador) - Occupational Exposure Limits	
Local name	Synthetic vitreous fibers - Continuous filament glass fibers
OEL TWA	5 mg/m ³ (I - Inhalable particulate matter) 1 fibers/cm ³ (F - Respirable fibers)
Notations and remarks	TLV® Basis: URT irr. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH
Canada (Nova Scotia) - Occupational Exposure Limits	
Local name	Synthetic vitreous fibers - Continuous filament glass fibers
OEL TWA	5 mg/m ³ (I - Inhalable particulate matter) 1 fibers/cm ³ (F - Respirable fibers)
Notations and remarks	TLV® Basis: URT irr. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH
Canada (Ontario) - Occupational Exposure Limits	
Local name	Continuous filament glass fibres (Synthetic Vitreous Fibres (Man Made Mineral Fibres))
OEL TWAEV	5 mg/m ³ (I - Inhalable fraction) 1 fiber/mL (F - Respirable fibres)
Regulatory reference	Ontario Occupational Exposure Limits under Regulation 833
Canada (Prince Edward Island) - Occupational Exposure Limits	
Local name	Synthetic vitreous fibers - Continuous filament glass fibers
OEL TWA	5 mg/m ³ (I - Inhalable particulate matter)

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Glass, oxide, chemicals (65997-17-3)	
	1 fibers/cm ³ (F - Respirable fibers)
Notations and remarks	TLV® Basis: URT irr. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH
USA - ACGIH - Occupational Exposure Limits	
Local name	Synthetic vitreous fibers - Continuous filament glass fibers
ACGIH OEL TWA	5 mg/m ³ (I - Inhalable particulate matter) 1 fibers/cm ³ (F - Respirable fibers)
Remark (ACGIH)	TLV® Basis: URT irr. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH 2021

Copper (7440-50-8)	
Canada (Alberta) - Occupational Exposure Limits	
Local name	Copper
OEL TWA	0.2 mg/m ³ Fume 1 mg/m ³ Dusts/mists, as Cu
Regulatory reference	Alberta Regulation 191/2021
Canada (Quebec) - Occupational Exposure Limits	
Local name	Copper
VEMP (OEL TWA EV)	0.2 mg/m ³ Fume (as Cu) 1 mg/m ³ Dusts & mists (as Co)
Regulatory reference	S-2.1, r. 13 - Regulation respecting occupational health and safety
Canada (British Columbia) - Occupational Exposure Limits	
Local name	Copper, as Cu
OEL TWA	1 mg/m ³ Dusts and mists 0.2 mg/m ³ Fume
Regulatory reference	OHS Guidelines Part 5: Chemical Agents and Biological Agents (WorkSafe BC)
Canada (Manitoba) - Occupational Exposure Limits	
Local name	Copper, as Cu
OEL TWA	0.2 mg/m ³ (Fume) 1 mg/m ³ (Dusts and mists)
Notations and remarks	TLV® Basis: Irr; GI; metal fume fever
Regulatory reference	ACGIH 2025
Canada (New Brunswick) - Occupational Exposure Limits	
Local name	Copper Fume as Cu
OEL TWA	0.2 mg/m ³
Notations and remarks	Irr; GI; metal fume fever
Canada (Newfoundland and Labrador) - Occupational Exposure Limits	
Local name	Copper, as Cu

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OEL TWA	0.2 mg/m ³ (Fume) 1 mg/m ³ (Dusts and mists)
Notations and remarks	TLV® Basis: Irr; GI; metal fume fever
Regulatory reference	ACGIH 2025
Canada (Nova Scotia) - Occupational Exposure Limits	
Local name	Copper, as Cu
OEL TWA	0.2 mg/m ³ (Fume) 1 mg/m ³ (Dusts and mists)
Notations and remarks	TLV® Basis: Irr; GI; metal fume fever
Regulatory reference	ACGIH 2025
Canada (Nunavut) - Occupational Exposure Limits	
Local name	Copper, (as Cu)
OEL TWA	0.2 mg/m ³ Fume 1 mg/m ³ Dusts and mists
OEL STEL	0.6 mg/m ³ Fume 3 mg/m ³ Dusts and mists
Regulatory reference	Occupational Health and Safety Regulations, Nu Reg 003-2016 (Amendment R-044-2021)
Canada (Northwest Territories) - Occupational Exposure Limits	
Local name	Copper, (as Cu)
OEL TWA	0.2 mg/m ³ Fume 1 mg/m ³ Dusts and mists
OEL STEL	0.6 mg/m ³ Fume 3 mg/m ³ Dusts and mists
Regulatory reference	Occupation Health and Safety Regulations R-039-2015 (R-090-2024)
Canada (Ontario) - Occupational Exposure Limits	
Local name	Copper - Fume
OEL TWAEV	0.2 mg/m ³
Regulatory reference	Ontario Occupational Exposure Limits under Regulation 833
Canada (Prince Edward Island) - Occupational Exposure Limits	
Local name	Copper, as Cu
OEL TWA	0.2 mg/m ³ (Fume) 1 mg/m ³ (Dusts and mists)
Notations and remarks	TLV® Basis: Irr; GI; metal fume fever
Regulatory reference	ACGIH 2025
Canada (Saskatchewan) - Occupational Exposure Limits	
Local name	Copper, (as Cu)
OEL TWA	0.2 mg/m ³ fume 1 mg/m ³ dusts and mists
OEL STEL	0.6 mg/m ³ fume 3 mg/m ³ dusts and mists

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Copper (7440-50-8)	
Regulatory reference	The Occupational Health and Safety Regulations, 2020. Chapter S-15.1 Reg 10

China & Hong Kong

Copper (7440-50-8)	
China - Occupational Exposure Limits	
Local name	铜 (按Cu计) # Copper, as Cu
OEL PC-TWA	1 mg/m ³ 尘# dust 0.2 mg/m ³ 烟# fume
Regulatory reference	GBZ 2.1-2019

European Union

Glass, oxide, chemicals (65997-17-3)	
EU - Binding Occupational Exposure Limit (BOEL)	
Local name	Refractory ceramic fibres: Glass, oxide, chemicals
BOEL TWA	0.3 fibers/mL
Regulatory reference	DIRECTIVE (EU) 2019/130 (amending Directive 2004/37/EC)
USA - ACGIH - Occupational Exposure Limits	
Local name	Synthetic vitreous fibers - Continuous filament glass fibers
ACGIH OEL TWA	5 mg/m ³ (I - Inhalable particulate matter) 1 fibers/cm ³ (F - Respirable fibers)
Remark (ACGIH)	TLV® Basis: URT irr. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH 2021

Copper (7440-50-8)	
Austria - Occupational Exposure Limits	
Local name	Kupfer und seine Verbindungen
MAK (OEL TWA)	1 mg/m ³ (als Cu berechnet, E) 0.1 mg/m ³ (als Rauch, als Cu berechnet, A)
MAK (OEL STEL)	4 mg/m ³ (als Cu berechnet, E, 4x 15(Miw) min) 0.4 mg/m ³ (als Rauch, als Cu berechnet, A, 4x 15(Miw) min)
Regulatory reference	BGBl. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
Local name	Cuivre (en Cu) # Koper (als Cu)
OEL TWA	0.2 mg/m ³ (fumées) # (rook) 1 mg/m ³ (poussières et brouillards de) # (stof en nevel)
Regulatory reference	Koninklijk besluit/Arrêté royal 16/11/2023

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Copper (7440-50-8)	
Bulgaria - Occupational Exposure Limits	
Local name	Мед
OEL TWA	0.1 mg/m ³ (метални пари (като мед)) 1 mg/m ³ (оксиди и неорганични съединения (като мед))
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. 28 от 2024 г., в сила от 05.04.2024 г.)
Croatia - Occupational Exposure Limits	
Local name	Bakar
GVI (OEL TWA)	0.2 mg/m ³ dim (kao Cu) 1 mg/m ³ prašina (kao Cu)
KGVI (OEL STEL)	2 mg/m ³ prašina (kao Cu)
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, граниčnim vrijednostima izloženosti i biološkim граниčnim vrijednostima (NN 148/2023)
Czech Republic - Occupational Exposure Limits	
Local name	Měď
PEL (OEL TWA)	1 mg/m ³ (prach) (V - vdechovatelná frakce aerosolu) 0.1 mg/m ³ (dýmy) (R - respirabilní frakce aerosolu)
NPK-P (OEL C)	2 mg/m ³ (prach) (V - vdechovatelná frakce aerosolu) 0.2 mg/m ³ (dýmy) (R - respirabilní frakce aerosolu)
Remark	V - vdechovatelná frakce aerosolu, R - respirabilní frakce aerosolu.
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 20/2025 Sb.)
Denmark - Occupational Exposure Limits	
Local name	Kobber
OEL TWA	1 mg/m ³ pulver og støv 0.1 mg/m ³ røg, beregnet som Cu
Regulatory reference	BEK nr 1619 af 19/12/2024
Estonia - Occupational Exposure Limits	
Local name	Vask ja anorgaanilised ühendid (arvutatud vasele)
OEL TWA	1 mg/m ³ kogu tolm 0.2 mg/m ³ peentolm
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 02.04.2024, 13)
Finland - Occupational Exposure Limits	
Local name	Kupari, metalli
HTP (OEL TWA)	0.02 mg/m ³ Cu, alveolijae
Regulatory reference	HTP-ARVOT 2025 (Sosiaali- ja terveystieteiden ministeriö)
France - Occupational Exposure Limits	
Local name	Cuivre
VME (OEL TWA)	0.2 mg/m ³ (fumées) 1 mg/m ³ (poussières), en Cu

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Copper (7440-50-8)	
VLE (OEL C/STEL)	2 mg/m ³ (poussières), en Cu
Remark	Valeurs recommandées/admises
Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 6443, 2022; Outil65)
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	Kupfer und seine Verbindungen
AGW (OEL TWA)	0.045 mg/m ³ (A) 0.2 mg/m ³ (E)
Peak exposure limitation factor	(A): 8(II);(E): 4(II)
Remark	AGS - Ausschuss für Gefahrstoffe; 10 - Der Arbeitsplatzgrenzwert bezieht sich auf den Elementgehalt des entsprechenden Metalls
Regulatory reference	TRGS900
Hungary - Occupational Exposure Limits	
Local name	RÉZ és vegyületei (Cu-re számítva)
AK (OEL TWA)	0.1 mg/m ³ 0.01 mg/m ³ füst, respirábilis frakció
CK (OEL STEL)	0.2 mg/m ³
Remark	R (Azok az anyagok, amelyek egészségkárosító hatása RÖVID expozíció hatására jelentkezik)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Ireland - Occupational Exposure Limits	
Local name	Copper (as Cu)
OEL TWA	0.2 mg/m ³ Fume 1 mg/m ³ Dusts and mists
Remark	Advisory OELV (Advisory Occupational Exposure Limit Values)
Regulatory reference	Chemical Agents Code of Practice 2024
Latvia - Occupational Exposure Limits	
Local name	Varš
OEL TWA	0.5 mg/m ³
OEL STEL	1 mg/m ³
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 191).
Netherlands - Occupational Exposure Limits	
Local name	Koper
TGG-8u (OEL TWA)	0.1 mg/m ³ en anorganische koperverbindingen (inhaleerbaar)
Regulatory reference	Arbeidsomstandighedenregeling 2024
Poland - Occupational Exposure Limits	
Local name	Miedź i jej związki nieorganiczne
NDS (OEL TWA)	0.2 mg/m ³ w przeliczeniu na Cu

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Copper (7440-50-8)	
Regulatory reference	Dz. U. 2024 poz. 1017 wraz z późn. zm.
Portugal - Occupational Exposure Limits	
Local name	Cobre
OEL TWA	0.2 mg/m ³ Fumos, expressos em Cu 1 mg/m ³ Poeiras e névoas, expressos em Cu
Regulatory reference	Norma Portuguesa NP 1796:2014
Romania - Occupational Exposure Limits	
Local name	Cupru
OEL TWA	0.5 mg/m ³ (Pulberi)
OEL STEL	0.2 mg/m ³ (Fumuri) 1.5 mg/m ³ (Pulberi)
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Slovakia - Occupational Exposure Limits	
Local name	Meď a jej anorganické zlúčeniny (ako Cu)
NPHV (OEL TWA)	1 mg/m ³ inhalovateľná frakcia 0.2 mg/m ³ respirabilná frakcia a dymy
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (122/2024 Z. z.)
Spain - Occupational Exposure Limits	
Local name	Cobre
VLA-ED (OEL TWA)	0.01 mg/m ³ Fracción respirable
Remark	d (Véase UNE EN 481: Atmósferas en los puestos de trabajo. Definición de las fracciones por el tamaño de las partículas para la medición de aerosoles).
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2025. INSHT
Sweden - Occupational Exposure Limits	
Local name	Koppar och oorg. föreningar
NGV (OEL TWA)	0.01 mg/m ³ (respirabel fraktion som Cu)
Remark	25 (Med inhalerbar och respirabel fraktion menas de dammfraktioner som definieras i svensk standard SS-EN 481, Arbetsplatsluft – Partikelstorleksfraktioner för mätning av luftburna partiklar (utgåva 1, 1993). Med totaldamm menas de partiklar (aerosoler) som fastnar på ett filter i en totaldammprovtagare)
Regulatory reference	Arbetsmiljöverkets föreskrifter och allmänna råd (AFS 2023:14) om gränsvärden för luftvägsexponering i arbetsmiljön
United Kingdom - Occupational Exposure Limits	
Local name	Copper
WEL TWA (OEL TWA)	0.2 mg/m ³ fume (as Cu) 1 mg/m ³ and compounds, dusts and mists (as Cu)
WEL STEL (OEL STEL)	2 mg/m ³ and compounds, dusts and mists (as Cu)
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Switzerland - Occupational Exposure Limits	
Local name	Cuivre et ses composés inorganiques / Kupfer und seine anorganischen Verbindungen

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Copper (7440-50-8)	
MAK (OEL TWA)	0.1 mg/m ³ (i) / (e)
KZGW (OEL STEL)	0.2 mg/m ³ (i) / (e)
Critical toxicity	Poumons, Fimétal / Lunge, Metallrauch
Notation	SS _c / SS _c
Remark	NIOSH. Exprimé en Cu / NIOSH. Als Cu berechnet
Regulatory reference	www.suva.ch, 01.01.2025
USA - ACGIH - Occupational Exposure Limits	
Local name	Copper, as Cu
ACGIH OEL TWA	0.2 mg/m ³ (Fume) 1 mg/m ³ (Dusts and mists)
Remark (ACGIH)	TLV® Basis: Irr; GI; metal fume fever
Regulatory reference	ACGIH 2025
Dimethylformamide (68-12-2)	
EU - Binding Occupational Exposure Limit (BOEL)	
Local name	N,N Dimethylformamide
BOEL TWA	15 mg/m ³
	5 ppm
BOEL STEL	30 mg/m ³
	10 ppm
Notes	Skin (Substantial contribution to the total body burden via dermal exposure possible)
Regulatory reference	DIRECTIVE (EU) 2022/431 (amending Directive 2004/37/EC)
EU - Biological Limit Value (BLV)	
Local name	N,N-Dimethylformamide
BLV	15 mg/l Parameter: N-methylformamide - Medium: urine - Sampling time: post-shift
Regulatory reference	SCOEL List of recommended health-based BLVs and BGVs
Austria - Occupational Exposure Limits	
Local name	Dimethylformamid
MAK (OEL TWA)	15 mg/m ³
	5 ppm
MAK (OEL STEL)	30 mg/m ³ (4x 15(Miw) min)
	10 ppm (4x 15(Miw) min)
Remark	H. Fortpflanzungsgefährdend: D
Regulatory reference	BGBl. II Nr. 156/2021
Austria - Biological limit values	
Local name	Dimethylformamid

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Dimethylformamide (68-12-2)	
Remark	Eignung: Blut: Leberfunktionsprüfung: SGOT bis 50 U/l für Männer; bis 35 U/l für Frauen. SGPT bis 50 U/l für Männer; bis 35 U/l für Frauen. GGT bis 66 U/l für Männer; bis 39 U/l für Frauen. Eignung mit vorzeitiger Folgeuntersuchung: Bei Überschreiten von mindestens zwei der Grenzwerte im Blut. Der Zeitabstand zwischen den Untersuchungen beträgt bei Eignung: ein Jahr; bei Eignung mit vorzeitiger Folgeuntersuchung: drei Monate.
Regulatory reference	Verordnung über die Gesundheitsüberwachung am Arbeitsplatz 2017 (VGÜ 2017)
Belgium - Occupational Exposure Limits	
Local name	N,N-Diméthylformamide # N,N-Dimethylformamide
OEL TWA	2 mg/m ³ (Pour l'utilisation en tant que solvant dans les processus de filage à sec et humide de fibres synthétiques: à partir du 12 décembre 2025) # (Voor gebruik als oplosmiddel bij het droog- en natspinnen van synthetische vezels: met ingang van 12 december 2025)
	6 ppm (Pour l'utilisation en tant que solvant dans les processus de filage à sec et humide de fibres synthétiques: à partir du 12 décembre 2025) # (Voor gebruik als oplosmiddel bij het droog- en natspinnen van synthetische vezels: met ingang van 12 december 2025)
OEL STEL	30 mg/m ³
	10 ppm
Remark	D: la mention "D" signifie que la résorption de l'agent, via la peau, les muqueuses ou les yeux, constitue une partie importante de l'exposition totale. Cette résorption peut se faire tant par contact direct que par présence de l'agent dans l'air. # D: de vermelding "D" betekent dat de opname van het agens via de huid, de slijmvliezen of de ogen een belangrijk deel van de totale blootstelling vormt. Deze opname kan het gevolg zijn van zowel direct contact als zijn aanwezigheid in de lucht.
Regulatory reference	Koninklijk besluit/Arrêté royal 16/11/2023
Bulgaria - Occupational Exposure Limits	
Local name	Диметилформамид
OEL TWA	15 mg/m ³
	5 ppm
OEL STEL	30 mg/m ³
	10 ppm
Remark	Кожа (възможна е значителна резорбция чрез кожата); • (Химични агенти, за които са определени гранични стойности във въздуха на работната среда за Европейската общност)
Regulatory reference	Наредба № 10 от 26.09.2003 г. за защита на работещите от рискове, свързани с експозиция на канцерогени и мутагени при работа (изм. и доп. ДВ. бр. 28 от 2 Април 2024г.)
Croatia - Occupational Exposure Limits	
Local name	N,N-dimetilformamid; dimetil formamid
GVI (OEL TWA)	15 mg/m ³
	5 ppm
KGVI (OEL STEL)	30 mg/m ³
	10 ppm

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Dimethylformamide (68-12-2)	
Remark	Direktiva: 2022/431/EU. Napomena: Repr 1B, Koža (razvrstana kao tvar koja nadražuje kožu (H315))
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 148/2023)
Croatia - Biological limit values	
Local name	N,N-Dimetilformamid
BLV	20.5 µmol/l Karakteristični pokazatelj: N,N-dimetilformamid - Biološki uzorak: krv - Vrijeme uzorkovanja: na kraju izloženosti tijekom 4 sata 1.5 mg/l Karakteristični pokazatelj: N,N-dimetilformamid - Biološki uzorak: krv - Vrijeme uzorkovanja: na kraju izloženosti tijekom 4 sata 16.9 µmol/l Karakteristični pokazatelj: N-metilformamid - Biološki uzorak: krv - Vrijeme uzorkovanja: na kraju radne smjene 1 mg/l Karakteristični pokazatelj: N-metilformamid - Biološki uzorak: krv - Vrijeme uzorkovanja: na kraju radne smjene 23 mmol/mol Creatinine Karakteristični pokazatelj: N-metilformamid - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene 12 mg/g creatinine Karakteristični pokazatelj: N-metilformamid - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 91/2018)
Cyprus - Occupational Exposure Limits	
Local name	N,N-διμεθυλοφορμαμίδιο
OEL TWA	15 mg/m ³
	5 ppm
OEL STEL	30 mg/m ³
	10 ppm
Remark	δέρμα
Regulatory reference	Κανονισμοί του 2023 (Κ.Δ.Π. 220/2023)
Czech Republic - Occupational Exposure Limits	
Local name	N,N-Dimethylformamid
PEL (OEL TWA)	15 mg/m ³
	5 ppm
NPK-P (OEL C)	30 mg/m ³
	10 ppm
Remark	B - u látky je zaveden biologický expoziční test (BET) v moči nebo krvi, D - při expozici se významně uplatňuje pronikání faktoru kůže, I - dráždí sliznice (oči, dýchací cesty), resp. kůže, T - toxická pro reprodukci kategorie 1A a 1B (s větou H360 včetně příslušných kódů).
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 20/2025 Sb.)
Czech Republic - Biological limit values	
Local name	Dimethylformamid

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Dimethylformamide (68-12-2)	
BLV	15 mg/g creatinine Ukazatel: N-Methylformamid - Biologicky vzorek: moči - Doba odběru: konec směny 0.029 mmol/mmol Creatinine Ukazatel: N-Methylformamid - Biologicky vzorek: moči - Doba odběru: konec směny
Regulatory reference	Vyhláška č. 107/2013 Sb. (kterou se mění vyhláška č. 432/2003 Sb.)
Denmark - Occupational Exposure Limits	
Local name	N,N-Dimethylformamid
OEL TWA	15 mg/m ³
	5 ppm
OEL STEL	30 mg/m ³
	10 ppm
Remark	E (betyder, at stoffet har en EU-grænseværdi); H (betyder, at stoffet kan optages gennem huden)
Regulatory reference	BEK nr 1619 af 19/12/2024
Estonia - Occupational Exposure Limits	
Local name	Dimetüülformamiid
OEL TWA	15 mg/m ³
	5 ppm
OEL STEL	30 mg/m ³
	10 ppm
Remark	A (Naha kaudu kergesti imenduv aine), R (Reproduktiivtoksiline aine)
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 02.04.2024, 13)
Finland - Occupational Exposure Limits	
Local name	Dimetyyliformamidi (N,N-dimetyyliformamidi)
HTP (OEL TWA)	15 mg/m ³
	5 ppm
HTP (OEL STEL)	30 mg/m ³
	10 ppm
BOEL TWA	6 mg/m ³
	2 ppm
BOEL STEL	30 mg/m ³
	10 ppm
Remark	Iho. Lisääntymiselle vaaralliset tekijät
Regulatory reference	HTP-ARVOT 2025 (Sosiaali- ja terveysministeriö)
Finland - Biological limit values	
Local name	Dimetyyliformamidi (N,N-dimetyyliformamidi)
BLV	8 mg/l Parametri: Virtsan NMF (N-metyyliformamidi) - Näytteenottoajankohta: Välittömästi työvaiheen tai työvuoron päätyttyä, altistumisjakson loppupuolella.

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Dimethylformamide (68-12-2)	
Regulatory reference	HTP-ARVOT 2025 (Sosiaali- ja terveystieteiden ministeriö)
France - Occupational Exposure Limits	
Local name	N,N-Diméthylformamide
VME (OEL TWA)	15 mg/m ³
	5 ppm
VLE (OEL C/STEL)	30 mg/m ³
	10 ppm
Remark	Valeurs réglementaires contraignantes. Risque de pénétration percutanée, Toxique pour la reproduction de catégorie 1B
Regulatory reference	Article R4412-149 du Code du travail (réf.: INRS ED 6443, 2022; Outil65; Décret n° 2019-1487; Décret n° 2020-1546; Décret n° 2021-434; Décret n° 2021-1849; Décret n° 2024-307)
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	N,N-Dimethylformamid
AGW (OEL TWA)	15 mg/m ³
	5 ppm
Peak exposure limitation factor	2(II)
Remark	EU - Europäische Union (Von der EU wurde ein Luftgrenzwert festgelegt: Abweichungen bei Wert und Spitzenbegrenzung sind möglich); DFG - Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission); AGS - Ausschuss für Gefahrstoffe; H - hautresorptiv; Z - Ein Risiko der Fruchtschädigung kann auch bei Einhaltung des AGW und des BGW nicht ausgeschlossen werden
Regulatory reference	TRGS900
Germany - Biological limit values (TRGS 903)	
Local name	N,N-Dimethylformamid (Dimethylformamid)
Biological limit value	20 mg/l Parameter: N-Methylformamid plus N-Hydroxymethyl-N-methylformamid - Untersuchungsmaterial: U = Urin - Probenahmezeitpunkt: b) Expositionsende, bzw. Schichtende - Festlegung/Begründung: 05/2024 DFG 25 mg/g creatinine Parameter: N-Acetyl-S-(methylcarbamoyl)-L-cystein - Untersuchungsmaterial: U = Urin - Probenahmezeitpunkt: c) am Schichtende, bei Langzeitexposition nach mehreren vorangegangenen Schichten - Festlegung/Begründung: 05/2024 DFG
Regulatory reference	TRGS 903
Greece - Occupational Exposure Limits	
Local name	N,N-διμεθυλοφορμαμίδιο [Διμεθυλο-φορμαμίδιο, N,N-]
OEL TWA	15 mg/m ³
	5 ppm
OEL STEL	30 mg/m ³
	10 ppm
Remark	Δέρμα (Είναι πιθανή η σημαντική αύξηση της συνολικής επιβάρυνσης του λόγω δερματικής έκθεσης)

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Dimethylformamide (68-12-2)	
Regulatory reference	Π.Δ. 48/2024 - Προστασία των εργαζομένων από τους κινδύνους που συνδέονται με την έκθεση σε καρκινογόνους παράγοντες, μεταλλαξιογόνους παράγοντες ή τοξικές για την αναπαραγωγή ουσίες κατά την εργασία
Hungary - Occupational Exposure Limits	
Local name	N,N-DIMETILFORMAMID
AK (OEL TWA)	15 mg/m ³ 5 ppm
CK (OEL STEL)	30 mg/m ³ 10 ppm
Remark	b (Bőrön át is felszívódik), i (ingerlő anyag, amely izgatja a bőrt, nyálkahártyát, szemet vagy mindhármát), BEM (biológiai expozíciós mutató), Repr.(1B) (reprotoxikus); EU3 (2009/161/EK irányelvben közölt érték); T (Azok az anyagok, amelyek egészségkárosító hatása TARTÓS expozíciót követően jelentkeznek)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Hungary - Biological Exposure Indices	
Local name	Dimetilformamid
BEI	15 mg/l Biológiai expozíciós (hatás) mutató: N-metilformamid - Biológiai minta: vizeletben - Mintavétel ideje: m.v. (műszak végén) 254 µmol/l Biológiai expozíciós (hatás) mutató: N-metilformamid - Biológiai minta: vizeletben - Mintavétel ideje: m.v. (műszak végén)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Ireland - Occupational Exposure Limits	
Local name	N,N-Dimethylformamide
OEL TWA	15 mg/m ³ 5 ppm
OEL STEL	30 mg/m ³ 10 ppm
Remark	BOELV (Binding Occupational Exposure Limit Values), Repr.1B (Substances which are presumed human reproductive toxicants), Skin (Substances which have the capacity to penetrate intact skin when they come in contact with it and be absorbed into the body. A substantial contribution to the total body burden via dermal exposure is possible)
Regulatory reference	Chemical Agents Code of Practice 2024
Ireland - Biological limit values	
Local name	N,N-Dimethylformamide
BMGV	15 mg/l Parameter: N-methylformamide - Medium: urine - Sampling time: Post shift
Regulatory reference	Biological Monitoring Guidelines (HSA, 2011)
Italy - Occupational Exposure Limits	
Local name	N,N Dimetilformamide
OEL TWA	15 mg/m ³

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Dimethylformamide (68-12-2)	
	5 ppm
OEL STEL	30 mg/m ³
	10 ppm
Remark	Cute
Latvia - Occupational Exposure Limits	
Local name	N,N-dimetilformamīds
OEL TWA	15 mg/m ³
	5 ppm
OEL STEL	30 mg/m ³
	10 ppm
Remark	Āda. Repr. 1B
Regulatory reference	Ministru kabineta 2008. gada 29. septembra noteikumi Nr. 803 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 190).
Lithuania - Occupational Exposure Limits	
Local name	N,N-dimetilformamidas
IPRV (OEL TWA)	15 mg/m ³
	5 ppm
TPRV (OEL STEL)	30 mg/m ³
	10 ppm
Remark	R (reprodukcijai toksiškas poveikis); O (medžiaga į organizmą gali prasiskverbti pro nepažeistą odą); Šios medžiagos skystos formos skvarba per odą yra tokia didelė, kad gali sukelti pavojų gyvybei.
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Luxembourg - Occupational Exposure Limits	
Local name	N, N Diméthylformamide
OEL TWA	15 mg/m ³
	5 ppm
OEL STEL	30 mg/m ³
	10 ppm
Remark	Peau
Regulatory reference	Mémorial A N° 226 de 2021 concernant la protection de la sécurité et de la santé des salariés contre les risques liés à des agents chimiques sur le lieu de travail
Malta - Occupational Exposure Limits	
Local name	N,N-Dimethylformamide # N,N-Dimetilformammid
OEL TWA	15 mg/m ³
	5 ppm
OEL STEL	30 mg/m ³
	10 ppm

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Dimethylformamide (68-12-2)	
Remark	Skin # G1da
Netherlands - Occupational Exposure Limits	
Local name	N,N-Dimethylformamide
TGG-8u (OEL TWA)	15 mg/m ³
	5 ppm
TGG-15min (OEL STEL)	30 mg/m ³
	10 ppm
Remark	Reprotoxische stof. H (Huidopname) Stoffen die relatief gemakkelijk door de huid kunnen worden opgenomen, hetgeen een substantiële bijdrage kan betekenen aan de totale inwendige blootstelling, hebben in de lijst een H-aanduiding. Bij deze stoffen moeten naast maatregelen tegen inademing ook adequate maatregelen ter voorkoming van huidcontact worden genomen.
Regulatory reference	Arbeidsomstandighedenregeling 2024
Poland - Occupational Exposure Limits	
Local name	N,N-Dimetyloformamid
NDS (OEL TWA)	15 mg/m ³
	5 ppm
NDSch (OEL STEL)	30 mg/m ³
	10 ppm
Remark	Skóra (Oznakowanie substancji notacją „skóra” oznacza, że wchłanianie substancji przez skórę może być tak samo istotne jak przy narażeniu drogą oddechową).
Regulatory reference	Dz. U. 2024 poz. 1017 wraz z późn. zm.
Portugal - Occupational Exposure Limits	
Local name	Dimetilformamida
OEL TWA	10 ppm
Remark	P (Toxicidade percutânea); A4 (Agente não classificável como carcinogénico no Homem); IBE (Índice biológico de exposição)
Regulatory reference	Norma Portuguesa NP 1796:2014
Portugal - Biological Exposure Indices	
Local name	N,N-Dimetilformamida (DMF)
BEI	15 mg/l Parâmetro: N-Metilformamida - Meio: urina - Momento da amostragem: Fim do turno 40 mg/l Parâmetro: N-Acetil-S-(N-metilcarbamoil) cisteína - Meio: urina - Momento da amostragem: Antes do último turno da semana de trabalho - Notação: Sq (Semi quantitativo)
Regulatory reference	Norma Portuguesa NP 1796:2014
Romania - Occupational Exposure Limits	
Local name	N,N Dimetilformamidă
OEL TWA	15 mg/m ³
	5 ppm

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Dimethylformamide (68-12-2)	
OEL STEL	30 mg/m ³
	10 ppm
Remark	P - posibilitatea unei penetrări cutanate importante; R1B - poate dăuna fătului; poate dăuna fertilității
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Romania - Biological limit values	
Local name	N,N-Dimetil formamidă
BLV	15 mg/l Indicatorul biologic: Metil formamidă - Material biologic: urină - Momentul recoltării: sfârșit de schimb
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Slovakia - Occupational Exposure Limits	
Local name	N,N-dimetylformamid
NPHV (OEL TWA)	15 mg/m ³
	5 ppm
NPHV (OEL STEL)	30 mg/m ³
	10 ppm
Remark	Kategória reprodukčne toxických faktorov 1B – Látka s predpokladanou toxicitou pre ľudskú reprodukciu; K – prienik cez kožu: K celkovému zataženiu organizmu môže významne prispieť expozícia cez kožu.
Regulatory reference	Nariadenie vlády č. 356/2006 Z. z. (121/2024 Z. z.)
Slovakia - Biological limit values	
Local name	N,N-Dimetylformamid
BLV	35 mg/l Zisťovaný faktor: N-Metylformamid - Vyšetovaný materiál: moč - Čas odberu vzorky: b) koniec expozície alebo pracovnej zmeny
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (122/2024 Z. z.)
Slovenia - Occupational Exposure Limits	
Local name	N,N-dimetilformamid
OEL TWA	15 mg/m ³
	5 ppm
OEL STEL	30 mg/m ³
	10 ppm
Remark	K (Lastnost lažjega prehajanja snovi v organizem skozi kožo), BAT (Biološka mejna vrednost), EU
Regulatory reference	Uradni list RS, št. 72/2021 z dne 11.5.2021
Slovenia - Biological limit values	
Local name	N,N-dimetilformamid

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Dimethylformamide (68-12-2)	
BLV	20 mg/l Parameter: N-metilformamid in N-hidroksimetil-N-metilformamid - Biološki vzorec: urin - Čas vzorčenja: ob koncu delovne izmene 25 mg/g creatinine Parameter: N-acetil-S-(metilkarbamoil)-metilformamid - Biološki vzorec: urin - Čas vzorčenja: ob koncu delovne izmene, pri dolgotrajni izpostavljenosti: ob koncu delovne izmene po več zaporednih delavnikih
Regulatory reference	Uradni list RS, št. 72/2021 z dne 11.5.2021
Spain - Occupational Exposure Limits	
Local name	N,N-Dimetilformamida
VLA-ED (OEL TWA)	15 mg/m ³ 5 ppm
VLA-EC (OEL STEL)	30 mg/m ³ 10 ppm
Remark	VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo), vía dérmica (Indica que, en las exposiciones a esta sustancia, la aportación por la vía cutánea puede resultar significativa para el contenido corporal total si no se adoptan medidas para prevenir la absorción. En estas situaciones, es aconsejable la utilización del control biológico para poder cuantificar la cantidad global absorbida del contaminante), TR1B (Sustancias de las que se supone que son tóxicas para la reproducción humana), VLB® (Agente químico que tiene Valor Límite Biológico), 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 2025. INSHT
Spain - Biological limit values	
Local name	N,N-Dimetilformamida
BLV	40 mg/l Parámetro: N-Acetil-S-(N-metilkarbamoil) cisteína - Medio: Orina - Momento de muestreo: Principio de la última jornada de la semana laboral - Notas: 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) 15 mg/l Parámetro: N-Metilformamida - Medio: Orina - Momento de muestreo: Final de la jornada laboral
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2025. INSHT
Sweden - Occupational Exposure Limits	
Local name	N,N-Dimetylformamid
NGV (OEL TWA)	6 mg/m ³ 2 ppm
KGV (OEL STEL)	30 mg/m ³ 10 ppm

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Dimethylformamide (68-12-2)	
Remark	H (Ämnet tas lätt upp genom huden. Gränsvärdet bedöms ge tillräckligt skydd om huden är skyddad); R (Reproduktionsstörande ämnen, som kan skada fertiliteten och det ofödda barnet); 23 (Ämnet har ett indikativt EU-gränsvärde); 30 (Upptaget av ämnet i vätskeform genom huden är så stort att det kan ge livshotande skador)
Regulatory reference	Arbetsmiljöverkets föreskrifter och allmänna råd (AFS 2023:14) om gränsvärden för luftvägsexponering i arbetsmiljön
United Kingdom - Occupational Exposure Limits	
Local name	N,N-Dimethylformamide
WEL TWA (OEL TWA)	15 mg/m ³ 5 ppm
WEL STEL (OEL STEL)	30 mg/m ³ 10 ppm
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)
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Switzerland - Occupational Exposure Limits	
Local name	Diméthylformamide (DMF) / Dimethylformamid (DMF)
MAK (OEL TWA)	15 mg/m ³ 5 ppm
KZGW (OEL STEL)	30 mg/m ³ 10 ppm
Critical toxicity	Foie / Leber
Notation	R, R1 _B , SS _B , B / H, R1 _B , SS _B , B
Remark	INRS, NIOSH, DFG
Regulatory reference	www.suva.ch, 01.01.2025
Switzerland - BAT	
Local name	Diméthylformamide (DMF) / Dimethylformamid (DMF)
BAT	20 mg/l (Paramètre biologique: N-Méthylformamide plus N-Hydroxyméthyl-N-méthylformamide; Substrat d'examen: Urine; Moment du prélèvement: Fin de l'exposition, de la période de travail.) / (Biologischer Parameter: N-Methylformamid plus N-Hydroxymethyl-N-methylformamid; Untersuchungsmaterial: Urin; Probennahmezeitpunkt: Expositionsende, bzw. Schichtende.) 25 mg/g creatinine (Paramètre biologique: N-Acétyle-S-(méthyl-carbamoyl)-L-cysteine; 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.) / (Biologischer Parameter: N-Acetyl-S-(methylcarbamoyl)-L-cystein; Untersuchungsmaterial: Urin; Probennahmezeitpunkt: Expositionsende, bzw. Schichtende. Bei Langzeitexposition: nach mehreren vorangegangenen Schichten.)
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	Dimethylformamide

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Dimethylformamide (68-12-2)	
ACGIH OEL TWA	15 mg/m ³ 5 ppm
Remark (ACGIH)	TLV® Basis: Liver dam; eye & URT irr. Notations: Skin; BEI
Regulatory reference	ACGIH 2025
USA - ACGIH - Biological Exposure Indices	
Local name	Dimethylformamide
BEI	30 mg/l Parameter: Total N-Methylformamide - Medium: urine - Sampling time: End of shift 30 mg/l Parameter: N-Acetyl-S-(N-methylcarbamoyl) cysteine - Medium: urine - Sampling time: End of shift at end of workweek
Remark	Total N-Methylformamide represents the sum of N-Methylformamide and N-(Hydroxymethyl)-N-Methylformamide
Regulatory reference	ACGIH 2025

Japan

Glass, oxide, chemicals (65997-17-3)	
Japan - Occupational Exposure Limits (JSOH)	
Local name	ガラス # glass, oxide, chemicals
JSOH OEL	0.01 mg/m ³ Ag として 0.05 mg/m ³ Cd として 0.05 mg/m ³ Co として 0.5 mg/m ³ Cr として 0.02 mg/m ³ 吸入性粉塵、Mn として、有機マンガ化合物を除く 0.1 mg/m ³ 総粉塵、Mn として、有機マンガ化合物を除く 0.03 mg/m ³ Pb として、アルキル鉛化合物を除く 0.1 mg/m ³ Sb として、スチピンを除く 0.1 mg/m ³ Se として、セレン化水素、六フッ素化セレンを除く
Regulatory reference	JCDB の調査による

Korea

Copper (7440-50-8)	
Korea - Occupational Exposure Limits	
Local name	구리 # Copper
ISHA OEL TWA	1 mg/m ³ (분진 및 미스트) # (Dust & mist, as Cu) 0.1 mg/m ³ (흠) # (Fume)
ISHA OEL STEL	2 mg/m ³ (분진 및 미스트) # (Dust & mist, as Cu)
Regulatory reference	고용노동부고시 제2020-48호 # MOEL Public Notice. No. 2020-48

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Singapore

Copper (7440-50-8)	
Singapore - Occupational Exposure Limits	
Local name	Copper
PEL (OEL TWA)	0.2 mg/m ³ Fume 1 mg/m ³ Dusts and mists, as Cu
Regulatory reference	WSH Regulations 2014

Taiwan

Copper (7440-50-8)	
Taiwan - Occupational Exposure Limits	
Local name	銅# Copper
OEL TWA	0.2 mg/m ³ 熏煙# fume 1 mg/m ³ 粉塵和霧滴 (以銅計) # dusts and mists (as Cu)
Regulatory reference	勞工作業場所容許暴露標準 (2018.03.14 修正) # Standards of Permissible Exposure Limits of Airborne Hazardous Substances in Workplace (2018.03.14 Modified)

United States

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No additional information available	
Dimethylformamide (68-12-2)	
No additional information available	
USA - ACGIH - Occupational Exposure Limits	
Local name	Dimethylformamide
ACGIH OEL TWA	15 mg/m ³ 5 ppm
Remark (ACGIH)	TLV® Basis: Liver dam; eye & URT irr. Notations: Skin; BEI
Regulatory reference	ACGIH 2025
USA - ACGIH - Biological Exposure Indices	
Local name	Dimethylformamide
BEI	30 mg/l Parameter: Total N-Methylformamide - Medium: urine - Sampling time: End of shift 30 mg/l Parameter: N-Acetyl-S-(N-methylcarbamoyl) cysteine - Medium: urine - Sampling time: End of shift at end of workweek
Remark	Total N-Methylformamide represents the sum of N-Methylformamide and N-(Hydroxymethyl)-N-Methylformamide
Regulatory reference	ACGIH 2025
USA - OSHA - Occupational Exposure Limits	
Local name	Dimethylformamide
OSHA PEL TWA	30 mg/m ³

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Dimethylformamide (68-12-2)	
	10 ppm
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1
Glass, oxide, chemicals (65997-17-3)	
No additional information available	
USA - ACGIH - Occupational Exposure Limits	
Local name	Synthetic vitreous fibers - Continuous filament glass fibers
ACGIH OEL TWA	5 mg/m ³ (I - Inhalable particulate matter)
	1 fibers/cm ³ (F - Respirable fibers)
Remark (ACGIH)	TLV® Basis: URT irr. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH 2021
Copper (7440-50-8)	
No additional information available	
USA - ACGIH - Occupational Exposure Limits	
Local name	Copper, as Cu
ACGIH OEL TWA	0.2 mg/m ³ (Fume)
	1 mg/m ³ (Dusts and mists)
Remark (ACGIH)	TLV® Basis: Irr; GI; metal fume fever
Regulatory reference	ACGIH 2025
USA - OSHA - Occupational Exposure Limits	
Local name	Copper
OSHA PEL TWA	0.1 mg/m ³ (Fume (as Cu))
	1 mg/m ³ (Dusts and mists (as Cu))
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1

8.2. Appropriate engineering controls

Appropriate engineering controls : Ensure good ventilation of the work station.
Environmental exposure controls : Avoid release to the environment.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Wear recommended personal protective equipment.

Hand protection:
Protective gloves
Eye protection:
Safety glasses
Skin and body protection:
Wear suitable protective clothing
Respiratory protection:
In case of insufficient ventilation, wear suitable respiratory equipment

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Personal protective equipment symbol(s):



SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Solid
Appearance	: tan. light yellow. Solid. sheet.
Color	: tan light yellow
Odor	: No data available
Odor threshold	: No data available
pH	: No data available
Melting point	: No data available
Freezing point	: Not applicable
Boiling point	: No data available
Flash point	: Not applicable
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability	: Non flammable.
Vapor pressure	: No data available
Relative vapor density at 20°C	: No data available
Relative density	: 1.5 – 2.5
Solubility	: Negligible.
Partition coefficient n-octanol/water (Log Pow)	: No data available
Auto-ignition temperature	: Not applicable
Decomposition temperature	: > 392 °F (> 200°C)
Viscosity, kinematic	: Not applicable
Viscosity, dynamic	: No data available
Explosion limits	: Not applicable
Explosive properties	: Not classified.
Oxidizing properties	: Not oxidising.

9.2. Other information

VOC content	: < 0.2 %
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SECTION 10: Stability and reactivity

10.1. Reactivity

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

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Decomposes on exposure to temperature rise.

10.4. Conditions to avoid

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

10.5. Incompatible materials

Strong acids. Strong bases. Strong oxidizers. Amines.

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10.6. Hazardous decomposition products

Acrid fumes of acids. Aliphatic hydrocarbons. aromatic hydrocarbons. Carbon oxides (CO, CO₂). Nitrogen oxides. Hydrogen cyanide.

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

Dimethylformamide (68-12-2)	
LD50 oral rat	3010 mg/kg body weight Animal: rat, Guideline: OECD Guideline 401 (Acute Oral Toxicity), Remarks on results: other:, 95% CL: 2480 - 3650
LD50 dermal rat	> 3160 mg/kg body weight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity)
LC50 Inhalation - Rat	> 5.85 mg/l air Animal: rat, Guideline: OECD Guideline 403 (Acute Inhalation Toxicity)
ATE US (oral)	3010 mg/kg body weight
ATE US (dermal)	1100 mg/kg body weight
ATE US (dust, mist)	1.5 mg/l/4h

Glass, oxide, chemicals (65997-17-3)	
LD50 oral rat	> 2000 mg/kg body weight Animal: rat, Guideline: OECD Guideline 423 (Acute Oral toxicity - Acute Toxic Class Method)

Copper (7440-50-8)	
LD50 dermal rat	> 2000 mg/kg body weight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity), Guideline: EU Method B.3 (Acute Toxicity (Dermal)), Guideline: EPA OTS 798.1100 (Acute Dermal Toxicity), Guideline: other:
LC50 Inhalation - Rat	> 5.11 mg/l air Animal: rat, Guideline: OECD Guideline 436 (Acute Inhalation Toxicity: Acute Toxic Class Method)

Skin corrosion/irritation : Not classified
Serious eye damage/irritation : Not classified
Respiratory or skin sensitization : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified
Reproductive toxicity : Reproductive toxicity: Not classified.
STOT-single exposure : Not classified
STOT-repeated exposure : Not classified

Dimethylformamide (68-12-2)	
LOAEL (oral,rat,90 days)	475 mg/kg body weight Animal: rat, Guideline: OECD Guideline 407 (Repeated Dose 28-Day Oral Toxicity Study in Rodents)
NOAEL (oral,rat,90 days)	238 mg/kg body weight Animal: rat, Guideline: OECD Guideline 407 (Repeated Dose 28-Day Oral Toxicity Study in Rodents), Remarks on results: not determinable due to absence of adverse toxic effects

Aspiration hazard : Not classified
Viscosity, kinematic : Not applicable
Symptoms/effects after inhalation : None under normal conditions. Dust of the product, if present, may cause respiratory irritation after an excessive inhalation exposure.
Symptoms/effects after skin contact : None under normal conditions. Dust may cause irritation in skin folds or by contact in combination with tight clothing.
Symptoms/effects after eye contact : None under normal conditions. Dust from this product may cause eye irritation.

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Symptoms/effects after ingestion : None under normal conditions.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : The product is not considered harmful to aquatic organisms or to cause long-term adverse effects in the environment.

Dimethylformamide (68-12-2)	
LC50 - Fish [1]	7100 mg/l Test organisms (species): Lepomis macrochirus
EC50 - Crustacea [1]	> 100 mg/l Test organisms (species): Daphnia magna
LOEC (chronic)	3000 mg/l Test organisms (species): Daphnia magna Duration: '21 d'
NOEC (chronic)	1500 mg/l Test organisms (species): Daphnia magna Duration: '21 d'
NOEC chronic fish	> 102 mg/l Test organisms (species): Oryzias latipes Duration: '21 d'

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

Dimethylformamide (68-12-2)	
Partition coefficient n-octanol/water (Log Pow)	-0.87 Source: ICSC

12.4. Mobility in soil

Dimethylformamide (68-12-2)	
Mobility in soil	2.4 Source: ECHA

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods

Regional waste regulation : 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 : Comply with applicable regulations for solid waste disposal. Disposal must be done according to official regulations.
Additional information : Do not re-use empty containers.

SECTION 14: Transport information

In accordance with DOT / IMDG / IATA

14.1. UN number

Not regulated for transport

14.2. UN proper shipping name

Proper Shipping Name (DOT) : Not applicable
Proper Shipping Name (IMDG) : Not applicable
Proper Shipping Name (IATA) : Not applicable

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14.3. Transport hazard class(es)

DOT

Transport hazard class(es) (DOT) : Not applicable

IMDG

Transport hazard class(es) (IMDG) : Not applicable

IATA

Transport hazard class(es) (IATA) : Not applicable

14.4. Packing group

Packing group (DOT) : Not applicable

Packing group (IMDG) : Not applicable

Packing group (IATA) : Not applicable

14.5. Environmental hazards

Other information : No supplementary information available.

14.6. Special precautions for user

DOT

No data available

IMDG

No data available

IATA

No data available

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are present and listed as Active on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

This product or mixture is not known to contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

butanone, ethyl methyl ketone (78-93-3)

Listed on EPA Hazardous Air Pollutant (HAPS)

CERCLA RQ	5000 lb
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Dimethylformamide (68-12-2)

Listed on EPA Hazardous Air Pollutant (HAPS)

CERCLA RQ	100 lb
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acetone, propan-2-one, propanone (67-64-1)

CERCLA RQ	5000 lb
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Copper (7440-50-8)	
CERCLA RQ	5000 lb

15.2. International regulations

Australia

Australian Industrial Chemicals Introduction Scheme (AICIS)

Australian Inventory of Industrial Chemicals (AICIS introductions Inventory) status:

All the chemicals contained in this product are listed.

Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP)

No additional information is available.

Australian Pesticides and Veterinary Medicines Authority (APVMA)

No additional information is available.

Canada

butanone; ethyl methyl ketone (78-93-3)
Listed on the Canadian DSL (Domestic Substances List)

Dimethylformamide (68-12-2)
Listed on the Canadian DSL (Domestic Substances List)

acetone; propan-2-one; propanone (67-64-1)
Listed on the Canadian DSL (Domestic Substances List)

Glass, oxide, chemicals (65997-17-3)
Listed on the Canadian DSL (Domestic Substances List)

Copper (7440-50-8)
Listed on the Canadian DSL (Domestic Substances List)

China & Hong Kong

Regulation on the Safety Management of Hazardous Chemicals	Catalogue of Hazardous Chemicals (2015) 236, 2-Butanone 460, N,N-Dimethylformamide 137, Acetone
Rules for dangerous goods transport by railway	List of dangerous goods by railway (2009) 31173, 2-Butanone 32127, N,N-Dimethylformamide 31025, Acetone
Regulation on the Control of Precursor Chemicals	List of Precursor Chemicals 2-Butanone (CAS-No. 78-93-3) Acetone (CAS-No. 67-64-1)
New Chemical Substance Environmental Management Registration Measures (MEE Order 12 of 2020)	

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Inventory of Existing Chemical Substances in China (IECSC)	Contains listed substance(s) Glass, oxide, chemicals (CAS-No. 65997-17-3) Copper (CAS-No. 7440-50-8) 2-Butanone (CAS-No. 78-93-3) N,N-Dimethylformamide (CAS-No. 68-12-2) Acetone (CAS-No. 67-64-1)
Identification of major hazard installations for dangerous chemicals (GB 18218)	Contains listed substance(s) acetone (CAS-No. 67-64-1)
Law of the People's Republic of China on the Prevention and Control of Occupational Diseases	
Catalogue for Classification of Hazardous Factors of Occupational Diseases	Contains listed substance(s) Glass wool dust (CAS-No. 65997-17-3) Butanone (CAS-No. 78-93-3) dimethylformamide (CAS-No. 68-12-2) acetone (CAS-No. 67-64-1)
Regulations on the Safe Management of Hazardous Chemicals (Decree 591 of the State Council)	
Catalogue of Hazardous Chemicals (2015)	Contains Hazardous Chemical(s) Copper (CAS-No. 7440-50-8) 2-Butanone (CAS-No. 78-93-3) N,N-Dimethylformamide (CAS-No. 68-12-2) Acetone (CAS-No. 67-64-1) Considered as Hazardous Chemical(s)
Regulation on the Administration of Precursor Chemicals (Decree 445 of the State Council)	
Catalogue of Precursor Chemicals	Contains listed substance(s) Methyl ethyl ketone (CAS-No. 78-93-3) acetone (CAS-No. 67-64-1)
Other domestic regulatory lists	
Dangerous Goods List (GB 12268-2012)	Contains listed substance(s) ETHYL METHYL KETONE (METHYL ETHYL KETONE) (CAS-No. 78-93-3) N,N-DIMETHYLFORMAMIDE (CAS-No. 68-12-2) ACETONE (CAS-No. 67-64-1)

European Union

EU-Regulations

EU restriction list (REACH Annex XVII)		
Reference code	Applicable on	Entry title or description
3(a)	Dimethylformamide	Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 2.1 to 2.4, 2.6 and 2.7, 2.8 types A and B, 2.9, 2.10, 2.12, 2.13 categories 1 and 2, 2.14 categories 1 and 2, 2.15 types A to F
3(b)	Dimethylformamide	Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 3.1 to 3.6, 3.7 adverse effects on sexual function and fertility or on development, 3.8 effects other than narcotic effects, 3.9 and 3.10
76.	Dimethylformamide	N,N-dimethylformamide

Contains substance(s) listed on the REACH Candidate List in concentrations $\geq 0.1\%$ or SCL: N,N-dimethylformamide (EC 200-679-5, CAS 68-12-2)

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

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

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

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Contains no substance(s) listed on the Ozone Depletion list (Regulation EU 2024/590 on substances that deplete the ozone layer)
Contains no substance(s) listed on the Explosives Precursors list (Regulation EU 2019/1148 on the marketing and use of explosives precursors)
VOC content : < 0.2 %
Contains no substance(s) listed on the Drug Precursors list (Regulation EC 273/2004 on the manufacture and the placing on market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances)

National regulations

Austria

Ordinance on Flammable Liquids (VbF) : Auto detect

France	
Occupational diseases	
Code	Description
RG 84	Conditions caused by liquid organic solvents for professional use: saturated or unsaturated aliphatic or cyclic liquid hydrocarbons and mixtures thereof; liquid halogenated hydrocarbons; nitrated derivatives of aliphatic hydrocarbons; alcohols; glycols, glycol ethers; ketones; aldehydes; aliphatic and cyclic ethers, including tetrahydrofuran; esters; dimethylformamide and dimethylacetamine; acetonitrile and propionitrile; pyridine; dimethylsulfone and dimethylsulfoxide

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 1, Slightly hazardous to water (Classification according to AwSV, Annex 1)

Override matching entry (12. BImSchV) : Is not subject to the Major Accidents Ordinance (12. BImSchV)

Netherlands

SZW-lijst van kankerverwekkende stoffen : Glass, oxide, chemicals is listed

SZW-lijst van mutagene stoffen : Glass, oxide, chemicals is listed

SZW-lijst van reprotoxische stoffen – Borstvoeding : None of the components are listed

SZW-lijst van reprotoxische stoffen – Vruchtbaarheid : None of the components are listed

SZW-lijst van reprotoxische stoffen – Ontwikkeling : Dimethylformamide is listed

Switzerland

Storage class (LK) : NG - Non-hazardous

Japan

Chemical Substances Control Law	Priority Assessment Chemical Substances (Article 2, Paragraph (5) of the Act) N,N-Dimethylformamide
Industrial Safety and Health Law	Class 2 Organic Solvents etc. (Enforcement Order, Art., Appended Table 6-2, Ordinance on Prevention of Organic Solvent Poisoning, Art.1, Para.1, Item 4) Acetone Methyl ethyl ketone N,N-Dimethylformamide
	Working Environment Assessment Standard (Act, Art.65-2, Para.1) Acetone Methyl ethyl ketone N,N-Dimethylformamide
	【After amendment of April 2025】 Dangerous or Harmful Substances for Labelling of Chemical Name etc. (Act Art.57 Para.1, Enforcement Order, Art.18 Item 2 to 3, Ordinance on Industrial Safety and Health, Art.30 Appended Table No.2) Acetone Methyl ethyl ketone N,N-Dimethylformamide

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	<p>【After amendment of April 2026】 Dangerous or Harmful Substances for Labelling of Chemical Name etc. (Act Art.57 Para.1, Enforcement Order, Art.18 Item 2 to 3, Ordinance on Industrial Safety and Health, Art.30 Appended Table No.2) Acetone Methyl ethyl ketone N,N-Dimethylformamide</p>
	<p>Dangerous or Harmful Substances for Labelling of Chemical Name etc. (Act Art.57 Para.1, Enforcement Order, Art.18 Item 1 and 2, Appended Table No.9) Copper and its compounds Acetone Methyl ethyl ketone N,N-Dimethylformamide</p>
	<p>【After amendment of April 2025】 Dangerous or Harmful Substances for Labelling of Chemical Name etc. (Act Art.57 Para.1, Enforcement Order, Art.18 Item 1 and 3, Appended Table No.9) Copper and its compounds</p>
	<p>【After amendment of April 2026】 Dangerous or Harmful Substances for Labelling of Chemical Name etc. (Act Art.57 Para.1, Enforcement Order, Art.18 Item 1 and 3, Appended Table No.9) Copper and its compounds</p>
	<p>Dangerous Substances, Flammable Substances (Enforcement Order, Art., Appended Table 1, Item 4) Acetone Methyl ethyl ketone</p>
	<p>Published Substances of the Guidelines for Preventing the Impairment of Workers' Health (Act, Art.28, Para.3, MHLW Noticed Guideline) N,N-Dimethylformamide</p>
	<p>Dangerous or Harmful Substances for Notification of Chemical Name etc. on SDS (Act, Art.57-2, Enforcement Order, Art.18-2 Item 1 and 2, Appended Table 9) Copper and its compounds (Ordinance number: 379) (30 ~ 40%) Acetone (Ordinance number: 17) (under 5%) Methyl ethyl ketone (Ordinance number: 570) (under 5%) N,N-Dimethylformamide (Ordinance number : 298) (under 5%)</p>
	<p>【After amendment of April 2025】 Dangerous or Harmful Substances for Notification of Chemical Name etc. on SDS (Act, Art.57-2 Para.1, Enforcement Order, Art.18-2 Item 2 to 3, Ordinance on Industrial Safety and Health, Art.34-2 Appended Table No.2) Acetone (under 5%) Methyl ethyl ketone (under 5%) N,N-Dimethylformamide (under 5%)</p>
	<p>【After amendment of April 2026】 Dangerous or Harmful Substances for Notification of Chemical Name etc. on SDS (Act, Art.57-2 Para.1, Enforcement Order, Art.18-2 Item 2 to 3, Ordinance on Industrial Safety and Health, Art.34-2 Appended Table No.2) Acetone (under 5%) Methyl ethyl ketone (under 5%) N,N-Dimethylformamide (under 5%)</p>
	<p>Substances on Special medical examination, Current handling workers (Act, Art.66, Para.2, Enforcement Order, Art.22 Item 1) Acetone Methyl ethyl ketone N,N-Dimethylformamide</p>
	<p>【After amendment of April 2025】 Dangerous or Harmful Substances for Notification of Chemical Name etc. on SDS (Act, Art.57-2 Para.1, Enforcement Order, Art.18-2 Item 1 and 3, Appended Table 9) Copper and its compounds (30 ~ 40%)</p>

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	<p>【After amendment of April 2026】</p> <p>Dangerous or Harmful Substances for Notification of Chemical Name etc. on SDS (Act, Art.57-2 Para.1, Enforcement Order, Art.18-2 Item 1 and 3, Appended Table 9)</p> <p>Copper and its compounds (30 ~ 40%)</p> <p>Chemical substances that cause skin damage, skin-absorbable harmful substances (Ordinance on Industrial Safety and Health, Article 594-2, Para.1, list of substances applicable to No. 0704 Item 1, 5 based on July 4, 2023)</p> <p>Methyl ethyl ketone N,N-Dimethylformamide</p> <p>Chemical substances that damage the skin, etc. Harmful substances that cause skin irritation (Ordinance on Industrial Safety and Health, Article 594-2, Para.1, list of substances applicable to No. 0704 Item 1, 5 based on July 4, 2023)</p> <p>Copper</p>
Air Pollution Control Law	<p>Possible Hazardous Air Pollutants (Central Environment Council Report 9)</p> <p>N,N-Dimethylformamide</p>
Law Relating to Prevention of Marine Pollution and Maritime Disasters	<p>Dangerous Goods (Enforcement Order, Art. Appended Table 1-4)</p> <p>Acetone Methyl ethyl ketone</p> <p>Harmful Liquid Substances (Group Y), (Enforcement Order, Art. Appended Table 1)</p> <p>N,N-Dimethylformamide</p> <p>Harmful Liquid Substances (Group Z), (Enforcement Order, Art. Appended Table 1)</p> <p>Acetone Methyl ethyl ketone</p>
Water Pollution Prevention Law	<p>Designated Materials (Article 2, Paragraph 4 of the Law, Article 3-3 of the Enforcement Order)</p> <p>Copper and its compounds</p> <p>Living Environment Pollution Items (Act, Art.2, Enforcement Order, Art.3, Ministerial Ordinance to Provide for Effluent Standards, Art.1, Appended Table 2)</p> <p>Copper content</p>
Air Pollution Control Law	<p>Possible Hazardous Air Pollutants (Central Environment Council Report 9)</p> <p>Copper and its compounds\</p>
Waterworks Law	<p>Hazardous substances (Act, Art. 4, Para 2), Standard for water quality (Ministerial Ordinance No.101of 2003,)</p> <p>Copper and its compounds</p>
Sewerage Law	<p>Substances for Water Quality Standard (Act, Art.12-2, Para.2, Enforcement Order Art.9-4)</p> <p>Copper and its compounds</p>
Japanese Pollutant Release and Transfer Register Law (PRTR Law)	<p>Class 1 Designated Chemical Substances (Act, Art.2, Para.2, Enforcement Order, Art.1 Appended Table 1)</p> <p>N,N-Dimethylformamide (Maintenance number : 232) (5.0%)</p>
Labor Standards Act	<p>Chemical Substances Causing Illness (Act, Art.75, Para.2, Enforcement Regulations, Appended Table No.1-2, Item 4-1)</p> <p>Acetone N,N-Dimethylformamide</p>

Korea

Occupational Safety and Health Act		
Threshold Limit Values Chemicals	Applicable	7440-50-8: Copper 78-93-3: 2-Butanone (Methyl ethyl ketone (M.E.K)) 68-12-2: Dimethylformamide 67-64-1: Acetone
Hazardous Substances Below Permissible Level	Applicable	68-12-2: Dimethylformamide
Hazardous Substances Subject to Working Environment Measurement	Applicable	7440-50-8: Copper (Measurement Cycle: 6 months) (contains above 1%) 78-93-3: Methyl ethyl ketone (Measurement Cycle: 6 months) (contains above 1%) 68-12-2: Dimethylformamide (Measurement Cycle: 6 months) (contains above 1%)

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		67-64-1: Acetone (Measurement Cycle: 6 months) (contains above 1%)
Hazardous Substances Subject to Workers Requiring Health Examination	Applicable	7440-50-8: Copper (Examination Cycle: 12 months) (contains above 1%) 78-93-3: Methyl ethyl ketone (Examination Cycle: 12 months) (contains above 1%) 68-12-2: Dimethylformamide (Examination Cycle: 12 months) (contains above 1%) 67-64-1: Acetone (Examination Cycle: 12 months) (contains above 1%)
Hazardous Substances Subject to Control	Applicable	7440-50-8: Copper and its compounds (contains above 1%) 78-93-3: Methyl ethyl ketone (M.E.K) (contains above 1%) 68-12-2: Dimethylformamide (contains above 0.3%) 67-64-1: Acetone (contains above 1%)
Substance Subject to Submission of PSM	Applicable	78-93-3: Butanone (Flammable liquids) (Manufacture · Handling: 5,000kg (Storage: 200,000kg)) 68-12-2: N, N-dimethylformamide (Flammable liquids) (Manufacture · Handling: 5,000kg (Storage: 200,000kg)) 67-64-1: Acetone (Flammable liquids) (Manufacture · Handling: 5,000kg (Storage: 200,000kg))
Safety Control of Dangerous Substances Act		
Safety Control of Dangerous Substances Act	Applicable	78-93-3: 2-Butanone (Class 4 Flammable liquid - category 2 First class Petroleum Water-insoluble (Designated quantity: 200 liter)) 68-12-2: N,N-Dimethylformamide (Class 4 Flammable liquid - category 4 Second class Petroleum Water-soluble (Designated quantity: 2,000 liter)) 67-64-1: Acetone (Class 4 Flammable liquid - category 2 First class Petroleum Water-soluble (Designated quantity: 400 liter))
Chemical Substances Control Act		
Toxic Substances	Applicable	7440-50-8: Copper (Exclude if particles size \geq 1mm) (Toxic-No.: 2025-1-1247 (contains above 1%)) 68-12-2: N,N-Dimethylformamide (Toxic-No.: 2014-1-694 (contains above 0.1%))
Wastes Control Act		
Hazardous Substances in Designated wastes	Applicable	7440-50-8: Copper and its compounds (Contained in an effluent; Threshold condition to verify (contains above 3mg/l))
Act on Registration and Evaluation of Chemicals (K-REACH)		
Korea Existing Chemicals Inventory (KECI)	Applicable	65997-17-3: Glass, oxide (KECI-No.: KE-17630) 7440-50-8: Copper (KECI-No.: KE-08896) 78-93-3: Methyl ethyl ketone; MEK, 2-Butanone (KECI-No.: KE- 24094) 68-12-2: N,N-Dimethylformamide ; Dimethylformamide (KECI-No. : KE-11411) 67-64-1: Acetone (KECI-No.: KE-29367)
Priority Existing Chemicals (PEC)	Applicable	78-93-3: Methyl ethyl ketone; MEK, 2-Butanone (PEC-No.: 43) 68-12-2: N,N-Dimethylformamide ; Dimethylformamide (PEC-No. : 18)
Substances Subject to Intensive Control	Applicable	68-12-2: N, N-dimethylformamide
Other Domestic Regulations		

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PRTR Substances	Applicable	78-93-3: Methyl ethyl ketone (Group 2) 68-12-2: N,N-Dimethylformamide (Group 2)
EU Regulatory Information		
EU Candidate list (SVHC)	Contains substance(s) listed on the REACH Candidate List in concentrations $\geq 0.1\%$ or SCL: N, N- dimethylformamide (EC 200-679-5, CAS 68-12-2)	

Singapore

Regulation		Component / Mixture
Workplace Safety and Health Act & Workplace Safety and Health (General Provisions) Regulations	Applicable	Copper; Butanone; N, N-dimethylformamide; Acetone
Environmental Protection and Management (Air Impurities) Regulations	Air Impurities Emission Limits	Copper
Environmental Public Health (Quality of Piped Drinking Water) Regulations	Drinking Water Quality Standards - Chemical Parameters	Copper
Fire Safety Act/Fire Safety (Petroleum and Flammable Materials) Regulations	Petroleum and Flammable Materials	Methyl ethyl ketone; Dimethylformamide; Acetone
Misuse of Drugs Act	Controlled Substances Useful for Manufacturing Controlled Drugs - Part II	Methyl ethyl ketone; Acetone

Taiwan

Occupational Safety and Health Act	Applicable	Glass, oxide, chemicals; Copper; Butanone; N, N-dimethylformamide; Acetone
Ordinance on Prevention of Organic Solvent Poisoning	Type Two	Methyl ethyl ketone; N,N- Dimethylformamide; Acetone
Methods and Facilities Standards for the Storage, Clearance and Disposal of Industrial Waste	Applicable	Glass, oxide, chemicals; Copper; Butanone; N, N-dimethylformamide; Acetone
Traffic Safety Rule	Applicable	Glass, oxide, chemicals; Copper; Butanone; N, N-dimethylformamide; Acetone

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm.

Component	State or local regulations
butanone, ethyl methyl ketone (78-93-3)	U.S. - Massachusetts - Right To Know List; U.S. - New Jersey - Right to Know Hazardous Substance List; U.S. - New York City - Right to Know Hazardous Substances List; U.S. - Pennsylvania - RTK (Right to Know) List
Dimethylformamide (68-12-2)	U.S. - Massachusetts - Right To Know List; U.S. - New Jersey - Right to Know Hazardous Substance List; U.S. - New York City - Right to Know Hazardous Substances List; U.S. - Pennsylvania - RTK (Right to Know) List
acetone, propan-2-one, propanone (67-64-1)	U.S. - Massachusetts - Right To Know List; U.S. - New Jersey - Right to Know Hazardous Substance List; U.S. - New York City - Right to Know Hazardous Substances List; U.S. - Pennsylvania - RTK (Right to Know) List

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Component	State or local regulations
Copper (7440-50-8)	U.S. - Massachusetts - Right To Know List; U.S. - New Jersey - Right to Know Hazardous Substance List; U.S. - New York City - Right to Know Hazardous Substances List; U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

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