SAFETY DATA SHEET

(REACH regulation (EC) n° 1907/2006 - n° 2015/830)

SECTION 1 : IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product name : LMM-6000 METAL MARKING AEROSOL SPRAY
Product code : LMM-6000AER.

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

Ceramic covering that will undergo heat treatment on glass and ceramics.

1.3. Details of the supplier of the safety data sheet

Registered company name : GRAVOTECH MARKING SAS.
Address : 56, avenue Jean Jaurès.10600.La Chapelle Saint Luc.France.
Telephone : +33 (0)3 25 41 65 65. Fax : +33 (0)3 25 79 04 25.
e-mail : info@gravograph.fr
http://www.gravograph.com

1.4. Emergency telephone number : +33 (0)1 45 42 59 59.

Association/Organisation : INRS / ORFILA http://www.centres-antipoison.net.

SECTION 2 : HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

In compliance with EC regulation No. 1272/2008 and its amendments.

Aerosol, Category 1 (Aerosol 1, H222 - H229).
Eye irritation, Category 2 (Eye Irrit. 2, H319).
Carcinogenicity, Category 2 (Carc. 2, H351).
Specific target organ toxicity (single exposure), Category 3 (STOT SE 3, H335).
This mixture does not present an environmental hazard. No known or foreseeable environmental damage under standard conditions of use.

2.2. Label elements

Mixture for aerosol application.

In compliance with EC regulation No. 1272/2008 and its amendments.

Hazard pictograms :

GHS07 GHS08 GHS02

Signal Word :
DANGER
Product identifiers :

042-001-00-9	MOLYBDENUM TRIOXIDE

Hazard statements :

H222	Extremely flammable aerosol.
H229	Pressurised container: May burst if heated.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer .

Precautionary statements - Prevention :

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No

smoking.

P211 Do not spray on an open flame or other ignition source.

P251 Do not pierce or burn, even after use.

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P264 Wash hands thoroughly after handling.

Precautionary statements - Response :

P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

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

P312 Call a POISON CENTER/doctor/if you feel unwell.

P337 + P313 If eye irritation persists: Get medical advice/attention.

Precautionary statements - Storage :

P410 + P412 Protect from sunlight. Do no expose to temperatures exceeding 50 oC/122oF.

Precautionary statements - Disposal :

P501 Dispose of contents/container at a disposal facility in accordance with local regulations.

2.3. Other hazards

The mixture does not contain substances classified as 'Substances of Very High Concern' (SVHC) >= 0.1% published by the European CHemicals Agency (ECHA) under article 57 of REACH: http://echa.europa.eu/fr/candidate-list-table

The mixture fulfils neither the PBT nor the vPvB criteria for mixtures in accordance with annexe XIII of the REACH regulations EC 1907/2006.

SECTION 3 : COMPOSITION/INFORMATION ON INGREDIENTS

3.2. Mixtures

Composition :

Identification	(EC) 1272/2008	Note	%
INDEX: 042-001-00-9 CAS: 1313-27-5 EC: 215-204-7 MOLYBDENUM TRIOXIDE	GHS08, GHS07 Wng Carc. 2, H351 Eye Irrit. 2, H319 STOT SE 3, H335	[1] [2]	25 <= x % < 40.7
CAS: 64-17-5 EC: 200-578-6 REACH: 01-2119457610-43 ETHANOL	GHS02 Dgr Flam. Liq. 2, H225	[1]	25 <= x % < 40.7
CAS: 12001-26-2 MICA		[1]	10 <= x % < 10.2
INDEX: 601-003-00-5 CAS: 74-98-6 EC: 200-827-9 REACH: 01-2119486944-21 PROPANE	GHS02, GHS04 Dgr Flam. Gas 1, H220	[1] [7]	2.5 <= x % < 4.1
CAS: 13718-26-8 EC: 237-272-7 SODIUM METAVANADATE	GHS06 Dgr Acute Tox. 3, H301 Acute Tox. 3, H331		1 <= x % < 2.1
CAS: 577-11-7 EC: 209-406-4 DOCUSATE SODIUM	GHS07 Wng Skin Irrit. 2, H315 Eye Irrit. 2, H319 Aquatic Chronic 3, H412		1 <= x % < 2.1

(Full text of H-phrases: see section 16)

Information on ingredients :

[7] Propellant gas

[1] Substance for which maximum workplace exposure limits are available.

[2] Carcinogenic, mutagenic or reprotoxic (CMR) substance.

SECTION 4 : FIRST AID MEASURES

As a general rule, in case of doubt or if symptoms persist, always call a doctor.
NEVER induce swallowing by an unconscious person.

4.1. Description of first aid measures

In the event of exposure by inhalation :

In the event of massive inhalation, remove the person exposed to fresh air. Keep warm and at rest.
If the person is unconscious, place in recovery position. Notify a doctor in all events, to ascertain whether observation and supportive hospital care will be necessary.
If breathing is irregular or has stopped, effect mouth-to-mouth resuscitation and call a doctor.

In the event of splashes or contact with eyes :

Wash thoroughly with fresh, clean water for 15 minutes holding the eyelids open.
If there is any redness, pain or visual impairment, consult an ophthalmologist.

In the event of swallowing :

In the event of swallowing, if the quantity is small (no more than one mouthful), rinse the mouth with water and consult a doctor.
Keep the person exposed at rest. Do not force vomiting.
Seek medical attention, showing the label.
If swallowed accidentally, call a doctor to ascertain whether observation and hospital care will be necessary. Show the label.

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

No data available.

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

No data available.

SECTION 5 : FIREFIGHTING MEASURES

Flammable.
Chemical powders, carbon dioxide and other extinguishing gas are suitable for small fires.

5.1. Extinguishing media

Keep packages near the fire cool, to prevent pressurised containers from bursting.

Suitable methods of extinction

In the event of a fire, use :
- sprayed water or water mist
- water with AFFF (Aqueous Film Forming Foam) additive
- halon
- foam
- multipurpose ABC powder
- BC powder
- carbon dioxide (CO_2)

Prevent the effluent of fire-fighting measures from entering drains or waterways.

Unsuitable methods of extinction

In the event of a fire, do not use :
- water jet

5.2. Special hazards arising from the substance or mixture

A fire will often produce a thick black smoke. Exposure to decomposition products may be hazardous to health.
Do not breathe in smoke.
In the event of a fire, the following may be formed :
- carbon monoxide (CO)
- carbon dioxide (CO_2)

5.3. Advice for firefighters

Due to the toxicity of the gas emitted on thermal decomposition of the products, fire-fighting personnel are to be equipped with autonomous insulating breathing apparatus.

SECTION 6 : ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Consult the safety measures listed under headings 7 and 8.

For non first aid worker

Because of the organic solvents contained in the mixture, eliminate sources of ignition and ventilate the area.
Avoid inhaling the vapors.

Avoid any contact with the skin and eyes.
If a large quantity has been spilt, evacuate all personnel and only allow intervention by trained operators equipped with safety apparatus.

For first aid worker

First aid workers will be equipped with suitable personal protective equipment (See section 8).

6.2. Environmental precautions

Contain and control the leaks or spills with non-combustible absorbent materials such as sand, earth, vermiculite, diatomaceous earth in drums for waste disposal.
Prevent any material from entering drains or waterways.

6.3. Methods and material for containment and cleaning up

Clean preferably with a detergent, do not use solvents.

6.4. Reference to other sections

No data available.

SECTION 7 : HANDLING AND STORAGE

Requirements relating to storage premises apply to all facilities where the mixture is handled.

7.1. Precautions for safe handling

Always wash hands after handling.
Remove and wash contaminated clothing before re-using.
Ensure that there is adequate ventilation, especially in confined areas.

Fire prevention :

Handle in well-ventilated areas.
Vapours are heavier than air. They can spread along the ground and form mixtures that are explosive with air.
Prevent the formation of flammable or explosive concentrations in air and avoid vapor concentrations higher than the occupational exposure limits.
Do not spray on a naked flame or any incandescent material.
Do not pierce or burn, even after use.
Use the mixture in premises free of naked flames or other sources of ignition and ensure that electrical equipment is suitably protected.
Keep packages tightly closed and away from sources of heat, sparks and naked flames.
Do not use tools which may produce sparks. Do not smoke.
Prevent access by unauthorised personnel.

Recommended equipment and procedures :

For personal protection, see section 8.
Observe precautions stated on label and also industrial safety regulations.
Do not breathe in aerosols.
Avoid inhaling vapors.
Avoid inhaling vapors. Carry out any industrial operation which may give rise to this in a sealed apparatus.
Provide vapor extraction at the emission source and also general ventilation of the premises.
Also provide breathing apparatus for certain short tasks of an exceptional nature and for emergency interventions.
In all cases, recover emissions at source.
Avoid eye contact with this mixture.
Avoid exposure - obtain special instructions before use.
Packages which have been opened must be reclosed carefully and stored in an upright position.

Prohibited equipment and procedures :

No smoking, eating or drinking in areas where the mixture is used.

7.2. Conditions for safe storage, including any incompatibilities

No data available.

Storage

Keep the container tightly closed in a dry, well-ventilated place.
Keep away from all sources of ignition - do not smoke.
Keep well away from all sources of ignition, heat and direct sunlight.
The floor must be impermeable and form a collecting basin so that, in the event of an accidental spillage, the liquid cannot spread beyond this area.
Pressurised container: protect from sunlight and do not expose to temperatures exceeding 50°C.

Packaging

Always keep in packaging made of an identical material to the original.

7.3. Specific end use(s)

No data available.

SECTION 8 : EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Occupational exposure limits :

- ACGIH TLV (American Conference of Governmental Industrial Hygienists, Threshold Limit Values, 2010) :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
64-17-5		1000 ppm		A3	
12001-26-2	3 (R) mg/m3				
74-98-6	1000 ppm				

- Germany - AGW (BAuA - TRGS 900, 29/01/2018) :

CAS	VME :	VME :	Excess	Notes
64-17-5		500 ppm 960 mg/m³		2(II)
74-98-6		1000 ppm 1800 mg/m³		4(II)

- Belgium (Arrêté du 09/03/2014, 2014) :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1313-27-5	0,5 mg/m3				
64-17-5	1000 ppm 1907 mg/m³				
12001-26-2	3 mg/m³				
74-98-6	1000 ppm				

- France (INRS - ED984 :2016) :

CAS	VME-ppm :	VME-mg/m3 :	VLE-ppm :	VLE-mg/m3 :	Notes :	TMP No :
1313-27-5	-	-	-	5	-	-
64-17-5	1000	1900	5000	9500	-	84

- Switzerland (SUVAPRO 2017) :

CAS	VME	VLE	Valeur plafond	Notations
1313-27-5	5 i mg/m³			
64-17-5	500 ppm 960 mg/m³	1000 ppm 1920 mg/m³		SSC
12001-26-2	3 a mg/m³			
74-98-6	1000 ppm 1800 mg/m³	4000 ppm 7200 mg/m³		

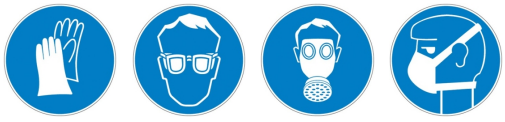
- UK / WEL (Workplace exposure limits, EH40/2005, 2011) :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1313-27-5	5 mg/m3	10 mg/m3			
64-17-5	1000 ppm 1920 mg/m³	- ppm - mg/m³			
12001-26-2	- ppm 0,8 mg/m³	- ppm - mg/m³			

8.2. Exposure controls

Personal protection measures, such as personal protective equipment

Pictogram(s) indicating the obligation of wearing personal protective equipment (PPE) :



Use personal protective equipment that is clean and has been properly maintained.
Store personal protective equipment in a clean place, away from the work area.
Never eat, drink or smoke during use. Remove and wash contaminated clothing before re-using. Ensure that there is adequate ventilation, especially in confined areas.

- Eye / face protection

Avoid contact with eyes.
Use eye protectors designed to protect against liquid splashes
Before handling, wear safety goggles with protective sides accordance with standard EN166.
In the event of high danger, protect the face with a face shield.
Prescription glasses are not considered as protection.
Individuals wearing contact lenses should wear prescription glasses during work where they may be exposed to irritant vapours.
Provide eyewash stations in facilities where the product is handled constantly.

- Hand protection

Use suitable protective gloves that are resistant to chemical agents in accordance with standard EN374.
Gloves must be selected according to the application and duration of use at the workstation.

Protective gloves need to be selected according to their suitability for the workstation in question : other chemical products that may be handled, necessary physical protections (cutting, pricking, heat protection), level of dexterity required.
Type of gloves recommended :
- Nitrile rubber (butadiene-acrylonitrile copolymer rubber (NBR))
Recommended properties :
- Impervious gloves in accordance with standard EN374

- Body protection

Work clothing worn by personnel shall be laundered regularly.
After contact with the product, all parts of the body that have been soiled must be washed.

- Respiratory protection

Avoid breathing vapours.
If the ventilation is insufficient, wear appropriate breathing apparatus.
When workers are confronted with concentrations that are above occupational exposure limits, they must wear a suitable, approved, respiratory protection device.
Type of FFP mask :
Wear a disposable half-mask aerosol filter in accordance with standard EN149.
Category :
- FFP1
Anti-gas and vapour filter(s) (Combined filters) in accordance with standard EN14387 :
- A1 (Brown)
Particle filter according to standard EN143 :
- P1 (White)

SECTION 9 : PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

General information :

Physical state :	Fluid liquid.
	Spray.
Colour:	White.

Important health, safety and environmental information

pH :	Not relevant.
Explosive properties, lower explosivity limit (%) :	2.1
Explosive properties, upper explosivity limit (%) :	19.0
Vapour pressure (50°C) :	Below 110 kPa (1.10 bar).
Density :	> 1
Water solubility :	Insoluble.
Chemical combustion heat :	Not specified.
Inflammation time :	Not specified.
Deflagration density :	Not specified.
Inflammation distance :	Not specified.
Flame height :	Not specified.
Flame duration :	Not specified.

9.2. Other information

No data available.

SECTION 10 : STABILITY AND REACTIVITY

10.1. Reactivity

No data available.

10.2. Chemical stability

This mixture is stable under the recommended handling and storage conditions in section 7.

10.3. Possibility of hazardous reactions

When exposed to high temperatures, the mixture can release hazardous decomposition products, such as carbon monoxide and dioxide, fumes and nitrogen oxide.

10.4. Conditions to avoid

Any apparatus likely to produce a flame or to have a metallic surface at high temperature (burners, electric arcs, furnaces etc.) must not be allowed on the premises.
Avoid :
- heating
- heat

10.5. Incompatible materials

Keep away from :
- oxidising agents

10.6. Hazardous decomposition products

The thermal decomposition may release/form :
- carbon monoxide (CO)
- carbon dioxide (CO2)

SECTION 11 : TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

May have reversible effects on the eyes, such as eye irritation which is totally reversible by the end of observation at 21 days.
Splashes in the eyes may cause irritation and reversible damage
Respiratory tract irritation may occur, together with symptoms such as coughing, choking and breathing difficulties.
Suspected human carcinogen.

11.1.1. Substances

Acute toxicity :

ETHANOL (CAS: 64-17-5)

Oral route :	LD50 = 6200 mg/kg Species : Rat
Dermal route :	LD50 > 20000 mg/kg Species : Rabbit
Inhalation route (n/a) :	LC50 > 8000 mg/l Species : Rat

11.1.2. Mixture

No toxicological data available for the mixture.

Monograph(s) from the IARC (International Agency for Research on Cancer) :

CAS 64-17-5 : IARC Group 1 : The agent is carcinogenic to humans.
CAS 1313-27-5 : IARC Group 2B : The agent is possibly carcinogenic to humans.

SECTION 12 : ECOLOGICAL INFORMATION

12.1. Toxicity

12.1.1. Substances

ETHANOL (CAS: 64-17-5)

Fish toxicity :	LC50 = 8140 mg/l Duration of exposure : 48 h
Crustacean toxicity :	EC50 > 9268 mg/l Duration of exposure : 48 h

12.1.2. Mixtures

No aquatic toxicity data available for the mixture.

12.2. Persistence and degradability

12.2.1. Substances

ETHANOL (CAS: 64-17-5)

Biodegradability :	no degradability data is available, the substance is considered as not degrading quickly.

12.3. Bioaccumulative potential

No data available.

12.4. Mobility in soil

No data available.

12.5. Results of PBT and vPvB assessment

No data available.

12.6. Other adverse effects

No data available.

German regulations concerning the classification of hazards for water (WGK) :

WGK 2 (VwVwS vom 27/07/2005, KBws) : Hazardous for water.

SECTION 13 : DISPOSAL CONSIDERATIONS

Proper waste management of the mixture and/or its container must be determined in accordance with Directive 2008/98/EC.

13.1. Waste treatment methods

Do not pour into drains or waterways.

Waste :

Waste management is carried out without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals.

Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector or company.

Do not contaminate the ground or water with waste, do not dispose of waste into the environment.

Soiled packaging :

Empty container completely. Keep label(s) on container.

Give to a certified disposal contractor.

SECTION 14 : TRANSPORT INFORMATION

Transport product in compliance with provisions of the ADR for road, RID for rail, IMDG for sea and ICAO/IATA for air transport (ADR 2017 - IMDG 2016 - ICAO/IATA 2017).

14.1. UN number

1950

14.2. UN proper shipping name

UN1950=AEROSOLS, flammable

14.3. Transport hazard class(es)

- Classification :

2.1

14.4. Packing group

-

14.5. Environmental hazards

-

14.6. Special precautions for user

ADR/RID	Class	Code	Pack gr.	Label	Ident.	LQ	Provis.	EQ	Cat.	Tunnel
	2	5F	-	2.1	-	1 L	190 327 344 625	E0	2	D

IMDG	Class	2°Label	Pack gr.	LQ	EMS	Provis.	EQ
	2	See SP63	-	See SP277	F-D,S-U	63 190 277 327 344 381 959	E0

IATA	Class	2°Label	Pack gr.	Passager	Passager	Cargo	Cargo	note	EQ
	2.1	-	-	203	75 kg	203	150 kg	A145 A167 A802	E0
	2.1	-	-	Y203	30 kg G	-	-	A145 A167 A802	E0

For limited quantities, see part 2.7 of the OACI/IATA and chapter 3.4 of the ADR and IMDG.

For excepted quantities, see part 2.6 of the OACI/IATA and chapter 3.5 of the ADR and IMDG.

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

No data available.

SECTION 15 : REGULATORY INFORMATION

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

- Classification and labelling information included in section 2:

The following regulations have been used:

- Directive 75/324/CEE modified by directive 2013/10/UE
- EU Regulation No. 1272/2008 amended by EU Regulation No. 2017/776 (ATP 10)

- Container information:

No data available.

- Particular provisions :

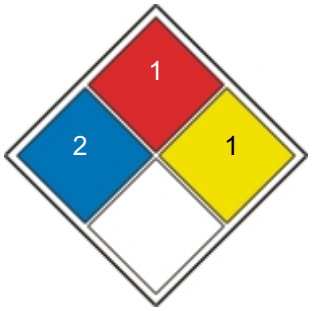
No data available.

- German regulations concerning the classification of hazards for water (WGK) :

WGK 2 (VwVwS vom 27/07/2005, KBws) : Hazardous for water.

- Standardised American system for the identification of hazards presented by the product in view of emergency procedures (NFPA 704) :

NFPA 704, Labelling: Health=2 Inflammability=1 Instability/Reactivity=1 Specific Risk=none



- Swiss ordinance on the incentive tax on volatile organic compounds :

64-17-5	éthanol, seulement s'il s'agit d'alcools impropres à la consommation (art. 31 de la loi fédérale sur l'alcool)
74-98-6	propane

15.2. Chemical safety assessment

No data available.

SECTION 16 : OTHER INFORMATION

Since the user's working conditions are not known by us, the information supplied on this safety data sheet is based on our current level of knowledge and on national and community regulations.

The mixture must not be used for other uses than those specified in section 1 without having first obtained written handling instructions.

It is at all times the responsibility of the user to take all necessary measures to comply with legal requirements and local regulations.

The information in this safety data sheet must be regarded as a description of the safety requirements relating to the mixture and not as a guarantee of the properties thereof.

Wording of the phrases mentioned in section 3 :

H220	Extremely flammable gas.
H225	Highly flammable liquid and vapour.
H301	Toxic if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer .
H412	Harmful to aquatic life with long lasting effects.

Abbreviations :

CMR: Carcinogenic, mutagenic or reprotoxic.
ADR : European agreement concerning the international carriage of dangerous goods by Road.
IMDG : International Maritime Dangerous Goods.
IATA : International Air Transport Association.
ICAO : International Civil Aviation Organisation
RID : Regulations concerning the International carriage of Dangerous goods by rail.
WGK : Wassergefahrdungsklasse (Water Hazard Class).
GHS02 : Flame
GHS07 : Exclamation mark
GHS08 : Health hazard
PBT: Persistent, bioaccumulable and toxic.
vPvB : Very persistent, very bioaccumulable.

SVHC : Substances of very high concern.