

TECHNICAL INFORMATION LASER MARKING PRODUCT

LMM-6018 Black Laser Marking Tape

1.0 Product Description

LMM-6018 is a laser marking tape designed for use on stainless steel, glass, ceramic, ceramic like and porcelain substrates. LMM-6018 can be applied to a substrate, laser marked to bond a portion of the tape to the substrate and then peeled away to leave the mark. LMM-6018 is designed for use in applications where spraying and removing our other laser marking materials is not possible or feasible. Rolls are available in 1", 2", 3" and 4" widths. They are 50 feet in length per roll, wound on a standard 3" core. Samples are available in 2" by 6" sheets.

2.0 Product Characteristics

2.1 Physical Properties

Appearance	Dark black adhesive tape with a white paper backing.
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2.2 Strengths of Product

Raises the contrast of laser marks on steel, glass and ceramic substrates. Allows Nd:YAG, CO₂ and fiber lasers to mark substrates such as steel, glass, and porcelain with a dark black mark. Easy to handle and use. Eliminates variation in application, requires no application equipment. Significantly reduces post marking clean up.

2.3 Recommended Application / Removal Techniques

Application Methods	Apply LMM-6018 to substrate and smooth out by hand, ensure that no air bubbles or gaps occur between tape and substrate. Moderate pressure should insure good adhesion. LMM-6018 may also be applied by automated machines.
Application Notes	Clean the surface of substrate so that it is free of any lubricants or oils. LMM-6018 must adhere well to the substrate to ensure a consistent mark.
Removal Methods	Remove tape by peeling from surface. Some burned paper residue may need to be wiped away. A cloth can be used with water or ethanol. Some cut out portions of tape may also need removed, depending on the mark.

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2.4 Laser Marking of Product

Laser Marking Method	CO ₂ , YAG or Fiber laser
Recommended Starting Point for Settings	CO ₂ : 100% power (35 watt laser) 5-10% speed 500 DPI / 500 PPI YAG- 30-50 watts 5-10 inches/sec speed

2.6 Additional Application Notes

For optimum mark quality, good adhesion and contact between the tape and the substrate is necessary. The tape must stick well to the substrate. If gaps or air bubbles are trapped between the tape and the substrate, poor mark quality will result. Use moderate pressure to insure good contact. Use of a squeegee will help insure good contact. Rough or uneven substrates such as porous non-glazed ceramics or bricks will also produce marks of lower resolution due to the roughness of the material

2.7 Marking Notes

Some burning of the paper backing will occur during marking and is normal. We recommend that the marking be done in a well ventilated area. When making large marks or a large quantity of marks, we recommend a ventilation system to exhaust the smoke created from the paper burning to the outside.

Marking may require some trial and error to optimize your laser with a particular substrate. Keep in mind that all lasers react differently depending on the substrate. Best results are obtained when marking at lower powers and slower speeds. High powers tend to damage glass substrates and should be avoided whenever possible. Experimentation should be done to find settings that produce an acceptable mark without glass damage.

3.0 Product Preparation

No preparation is necessary, use LMM-6018 tape as supplied.

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4.0 Storage Recommendations

Product must be stored in cool and dry conditions. Storage temperatures should be between 40°F (5°C) and 95°F (35°C). If stored as recommended, a minimum shelf life of six months after the production date is guaranteed.

IMPORTANT INFORMATION

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MATERIAL SAFETY DATA SHEET

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1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Name: GS LA LMM-6018 Marking Tape 1"x50 ft roll
Date of Preparation: 03/04/2013
Chemical Family: Decorative Coating
CAS-No.: Mixture
Recommended use: Industrial Use Only
Product Code: 1329869

2. HAZARDS IDENTIFICATION

Emergency Overview

Warning

Avoid dust formation. Do not breathe vapours/dust. May cause respiratory tract, eye and skin irritation. May cause allergic skin or respiratory reaction. May be harmful by inhalation. Contains crystalline silica which causes silicosis and lung cancer.

	Health:	HMIS	NFPA 704
Color: Black		2*	2
Physical state: Solid	Flammability:	1	1
Odor: Slight	Physical Hazard:	0	0
	PPE:	B	

Potential Health Effects

Principle routes of exposure: Inhalation, ingestion, skin and eye contact.

Eye contact: May cause irritation.

Skin contact: Prolonged skin contact may cause skin irritation and/or dermatitis. May cause allergic skin reaction.

Inhalation: Dust or fumes from firing irritating to respiratory tract. Fumes may cause lung inflammation. May be harmful by inhalation. May cause severe allergic respiratory reaction.

Ingestion: May irritate digestive tract.

Chronic toxicity: No known effects under normal conditions of use. Excessive inhalation of fumes or dust may cause chemical pneumonitis, cyanosis, and pulmonary edema. Chronic inhalation exposure can cause lung damage. Long term inhalation causes lung damage (silicosis and cancer). Respirable crystalline silica has been classified as a Group I (sufficient evidence in humans for carcinogenicity) carcinogenic by IARC and is listed by NTP as a substance which may reasonably be anticipated to be a carcinogen. Suspect cancer hazard (cobalt compound).

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %
Iron cobalt chromite black spinel Frit*	68186-97-0	50 - 60%
Poly (N-Butyl Methacrylate)	9003-63-8	10 - 20%
Naphtha, light aromatic	64742-95-6	5 - 10%
Solvent naphtha (petroleum), heavy arom.	64742-94-5	1 - 5%
Mineral spirits	8032-32-4	1 - 5%

* Frit, with CAS # [65997-18-4], is a mixture of inorganic chemical substances produced by rapidly quenching a molten, complex combination of materials, confining the chemical substances thus manufactured as non-migratory components of glassy solid flakes or granules. These components are present as part of the Frit.

4. FIRST AID MEASURES

Eye contact:	Rinse immediately with plenty of water, also under the eyelids. Get medical attention if irritation develops.
Skin contact:	Wash off immediately with soap and plenty of water. Remove and wash contaminated clothing before re-use. If symptoms persist, call a physician.
Inhalation:	Move to fresh air. If breathing is difficult, give oxygen. If symptoms persist, call a physician.
Ingestion:	Drink plenty of water. Do not induce vomiting. Consult a physician if necessary.
Notes to physician:	Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flash point (°C): Non combustible

Suitable extinguishing media: Carbon dioxide (CO2). Dry chemical. Water spray mist or foam.

Hazardous decomposition products under fire conditions: Carbon oxides. Metal oxides.

Special protective equipment for firefighters: As in any fire, wear self-contained breathing apparatus (pressure-demand, NIOSH approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Avoid dust formation. Do not breathe vapors/dust. Remove all non-essential people from the affected area. Ensure adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid contact with skin, eyes and clothing. Wear personal protective equipment.

Environmental precautions: Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system.

Methods for cleaning up: Wear personal protective equipment. Shovel into suitable container for disposal. Clean contaminated surface thoroughly. Dispose of promptly.

7. HANDLING AND STORAGE

Handling:

Avoid dust formation. Do not breathe vapours/dust. Handle in accordance with good industrial hygiene and safety practice. Use only in area provided with appropriate exhaust ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid contact with skin, eyes and clothing. Wear personal protective equipment. Do not eat, drink, or smoke in areas of use or storage. Do not take internally. Wash thoroughly after handling.

Storage:

Keep containers tightly closed in a dry, cool and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits

Minimize exposure in accordance with good hygiene practice.

Components	OSHA	ACGIH
Frit	0.5 mg/m ³ TWA Sb 5 mg/m ³ TWA Zr 5 mg/m ³ Ceiling Mn	0.5 mg/m ³ TWA Sb 5 mg/m ³ TWA Zr 0.2 mg/m ³ TWA Mn

Engineering measures:	Provide appropriate exhaust ventilation at machinery and at places where dust or fumes can be generated. Ensure that eyewash stations and safety showers are proximal to the workstation location.
Eye protection:	Safety glasses with side-shields.
Skin and body protection:	Lightweight protective clothing. Keep working clothes separately. Remove and wash contaminated clothing before re-use.
Hand protection:	Impervious gloves. Follow the recommendations given by the manufacturer of protective gloves.
Respiratory protection:	In case of insufficient ventilation, wear suitable respiratory equipment. NIOSH-approved respirators should be worn where engineering controls and work practices do not reduce exposure to or below the PEL. Seek professional advice prior to respirator selection and use.
Hygiene measures:	Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	Black	Physical state:	Solid
Odor:	Slight	Molecular weight:	No data available
Boiling point/range (°C):	No data available	pH:	No data available
Melting point/range (°C):	No data available	Specific gravity (Water =1):	No data available
Vapor density:	Non-volatile	Vapor pressure :	No data available
Evaporation Rate (Water = 1)	Non-volatile	Water solubility:	Insoluble
VOC content	0		

10. STABILITY AND REACTIVITY

Stability:	Stable at normal conditions.
Polymerization	Will not occur.
Hazardous decomposition products:	No decomposition if stored normally. Thermal decomposition can lead to release of irritating gases and vapors. Carbon oxides. Metal oxides.
Materials to avoid:	None under normal use.
Conditions to avoid	None known.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:	Information given is based on data on the components and the toxicology of similar products
Chronic Toxicity:	Contains crystalline silica which causes silicosis and lung cancer.
Carcinogenic Effects:	Respirable crystalline silica has been classified as a Group I (sufficient evidence in humans for carcinogenicity) carcinogenic by IARC and is listed by NTP as a substance which may reasonably be anticipated to be a carcinogen. Crystalline silica is also a known cause of silicosis, a non-cancerous lung disease caused by excessive exposure to crystalline silica. IARC has identified Cobalt and Cobalt compounds as "possibly carcinogenic" as a group.
Components	NIOSH - Pocket Guide - Target Organs
Chromium (III) Compound	eyes skin
Chromium	eyes respiratory system skin
Cobalt	respiratory system skin
Mineral spirits	eyes CNS respiratory system skin

Additional Target Organ Effects: Silica: Respiratory system

Component information, if any, is listed below

Iron cobalt chromite black spinel

IARC - Group 2B: Listed

Frit

LD50s and LC50s: Oral LD50 (Rat) = 2000 mg/kg

NTP: Known Human Carcinogen

NTPS. Carcinogen: Reasonably Anticipated To Be A Human Carcinogen

IARC - Group 1: Listed

IARC - Group 2A: Listed

IARC - Group 2B: Listed

Solvent naphtha (petroleum), heavy arom.

LD50s and LC50s: Dermal LD50 (Rabbit) = 2000 mg/kg

Oral LD50 (Rat) = 5000 mg/kg

Inhalation LC50 (Rat) = 590 mg/m³

Naphtha, light aromatic

LD50s and LC50s: Inhalation LC50 (Rat) = 3400 ppm

Oral LD50 (Rat) = 8400 mg/kg

Dermal LD50 (Rabbit) = 2000 mg/kg

Inhalation LC50 (Rat) = 5.2 mg/L

Mineral spirits

LD50s and LC50s: Inhalation LC50 (Rat) = 3400 ppm

12. ECOLOGICAL INFORMATION

Aquatic toxicity: No data is available on the product itself. Information given is based on data on the components and the ecotoxicology of similar products.

Solvent naphtha (petroleum), heavy arom.

Ecotoxicity - Fish Species Data:

96 h LC50 (Lepomis macrochirus) = 1740 mg/L static

96 h LC50 (Pimephales promelas) = 19 mg/L static

96 h LC50 (Oncorhynchus mykiss) = 2.34 mg/L

96 h LC50 (Pimephales promelas) = 41 mg/L

96 h LC50 (Pimephales promelas) = 45 mg/L flow-through

Ecotoxicity - Water Flea Data:

48 h EC50 (Daphnia magna) = 0.95 mg/L

Ecotoxicity - Freshwater Algae Data:

72 h EC50 (Skeletonema costatum) = 2.5 mg/L

Naphtha, light aromatic

Ecotoxicity - Fish Species Data:

96 h LC50 (Oncorhynchus mykiss) = 9.22 mg/L

Ecotoxicity - Water Flea Data:

48 h EC50 (Daphnia magna) = 6.14 mg/L

Mineral spirits

Ecotoxicity - Freshwater Algae Data:

72 h EC50 (Pseudokirchneriella subcapitata) = 4700 mg/L

Persistence and degradability: No information available.

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste must be disposed of in accordance with federal, state and local environmental control regulations. Where possible recycling is preferred to disposal or incineration.

14. TRANSPORT INFORMATION

DOT (U.S.)

14. TRANSPORT INFORMATION

Proper shipping name: Not Regulated

TDG (Canada)
Proper Shipping Name Not Regulated

IMDG
Proper Shipping Name Not Regulated

IATA
Proper shipping name Not Regulated

15. REGULATORY INFORMATION

U.S. Regulations:

TSCA: Not subject to TSCA 12(b) Export Notification

SARA 313:

Components	U.S. - CERCLA/SARA - Section 313 - Emission Reporting
Chromium (10 - 20%)	1.0 % de minimis concentration
Cobalt (10 - 20%)	0.1 % de minimis concentration
Cobalt inorganic compounds (50 - 60%)	0.1 % de minimis concentration
Chromium (III) Compound (50 - 60%)	1.0 % de minimis concentration

State Regulations

This product or its ingredients have been evaluated for New Jersey, Pennsylvania, and California Prop 65 supplier notification requirements. Substances that are subject to notification requirements, if any, are listed below.

Components	PARTK:
Chromium	Listed (PARTK)
Cobalt	Listed (PARTK)
Cobalt inorganic compounds	Listed
Chromium (III) Compound	Listed

Components	NJRTK:
Cobalt compounds	0520
Mineral spirits	0206
N-Butyl Methacrylate	0291
Chromium (III) Compound	2245 (1.0%)

Components	State Regulation - CA Prop65
Quartz silica	Carcinogen
Cobalt	Carcinogen

Canadian WHMIS

WHMIS hazard class: D2A Very toxic materials

Canadian Ingredient Disclosure List (IDL):

Components	Canada - WHMIS Ingredient Disclosure:
Cobalt compounds	0.1
Mineral spirits	1
Chromium (III) Compound	1

International Inventories

TSCA 8(b): Listed or exempt.
Canadian DSL/NDSL list All ingredient(s) are listed on the DSL or NDSL
EC-No. Listed or exempt.
Philippines (PICCS): Listed.
Japan (ENCS): Listed or exempt.
Korea (KECL): Listed.
China (IECS): Listed.
Australia (AICS): Listed.
New Zealand (NZIoC): Listed.

16. OTHER INFORMATION

For Industrial Use Only.

Prepared by: Ferro Technical Center

Disclaimer: The information and recommendations contained in this Material Safety Data Sheet have been compiled from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

End of Safety Data Sheet