



Material Safety Data Sheet

Conforms to EU Directive 91/155/EEC and ISO 11014-1

Product name : MK Series Mirakal Inks

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Version : 1.00

Date of issue : 24/10/2009.

Date of previous issue : No previous validation.

1. Identification of the substance/preparation and of the company

Product name : MK Series Mirakal Inks
Product code : 480 / 483 / 485 / 486
Use of the substance/preparation : Solvent based screen ink
Supplier : GL Specialized Inks (Pty) Ltd
 8 Hawthorne Place, Mahogany Ridge, Pinetown, Durban
Emergency telephone number : Office Hours:
 031 - 700 6455
 After hours:
 082 451 6588 (Jay)
 082 780 8837 (Julie)
 082 452 2143 (Gordon)

2. Composition/information on ingredients

Chemical characterization : Mixture.

Ingredient name	CAS number	%	EC number	Classification
resin mixture		13 - 27		Not classified.
pigment mixture		0 - 15		Not classified.
titanium dioxide	13463-67-7	0 - 40	236-675-5	Not classified.
2-butoxyethanol	111-76-2	9 - 31	203-905-0	Xn; R20/21/22 Xi; R36/38
lead chromate molybdate sulfate red	12656-85-8	0 - 35	235-759-9	Carc. Cat. 3; R40 Repr. Cat. 1; R61 Repr. Cat. 3; R62 R33 N; R50/53
lead sulfochromate yellow	1344-37-2	0 - 35	215-693-7	Carc. Cat. 3; R40 Repr. Cat. 1; R61 Repr. Cat. 3; R62 R33 N; R50/53
2-Butoxyethyl acetate	112-07-2	10 - 25	203-933-3	Xn; R20/21
propan-2-ol	67-63-0	3 - 8	200-661-7	F; R11 Xi; R36 R67
aluminium	7429-90-5	0 - 10	231-072-3	F; R15 R10
carbon black	1333-86-4	0 - 5	215-609-9	Not classified.
See section 16 for the full text of the R-phrases declared above				

Occupational exposure limits, if available, are listed in section 8.

This MSDS covers all formulations in the the range. Not all of the components listed will be present in an individual formulation. Formulae specific MSDS available on request.

3. Hazards identification

The preparation is classified as dangerous according to Directive 1999/45/EC and its amendments.

Classification : R10
 Carc. Cat. 3; R40
 Repr. Cat. 1; R61
 Repr. Cat. 3; R62
 Xn; R20/21
 Xi; R36/38
 R33
 N; R50/53

Physical/chemical hazards : Flammable.

- Human health hazards** : Harmful by inhalation and in contact with skin.
 Danger of cumulative effects.
 Irritating to eyes and skin.
 Limited evidence of a carcinogenic effect.
 May cause harm to the unborn child.
 Possible risk of impaired fertility.
- Environmental hazards** : Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

See section 11 for more detailed information on health effects and symptoms.

4. First aid measures

- Inhalation** : Move exposed person to fresh air. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Ingestion** : Get medical attention immediately. Wash out mouth with water. Remove dentures if any. Move exposed person to fresh air. Keep person warm and at rest. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Skin contact** : Wash contaminated skin with soap and water. Get medical attention. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Eye contact** : Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention.

See section 11 for more detailed information on health effects and symptoms.

5. Fire-fighting measures

Extinguishing media

- Suitable** : In case of fire, use water spray (fog), foam or dry chemical.
- Not suitable** : Do not use water jet.

- Special exposure hazards** : Flammable liquid and vapor. Vapor may cause flash fire. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

This material is very toxic to aquatic organisms. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

- Hazardous thermal decomposition products** : Decomposition products may include the following materials: carbon oxides (CO, CO₂), nitrogen oxides (NO, NO₂ etc.). Some metallic oxides.

- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Eliminate all ignition sources. Keep unnecessary personnel away. Use suitable protective equipment. Do not touch or walk through spilled material.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
- Methods for cleaning up** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

- Handling** : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Avoid release to the environment. Refer to special instructions/safety data sheet. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Packaging materials

- Recommended** : Use original container.

8. Exposure controls/personal protection

Exposure limit values :

<u>Ingredient name</u>	<u>Occupational exposure limits</u>
titanium dioxide	ACGIH (United States). TWA: 10 mg/m ³ ACGIH TLV (United States, 1/2004). Notes: Substance identified by other sources as a suspected or confirmed human carcinogen. 1996 Adoption Substances for which the TLV is higher than the OSHA Permissible Exposure Limit (PEL) and/or the NIOSH Recommended Exposure Limit (REL). See CFR 58(124) :36338-33351, June 30, 1993, for revised OSHA PEL. Refers to Appendix A -- Carcinogens.
2-butoxyethanol	TWA: 10 mg/m ³ 8 hour(s). Form: All forms EU OEL (Europe, 6/2000). Skin STEL: 246 mg/m ³ 15 minute(s). Form: All forms STEL: 50 ppm 15 minute(s). Form: All forms TWA: 98 mg/m ³ 8 hour(s). Form: All forms TWA: 20 ppm 8 hour(s). Form: All forms
2-Butoxyethyl acetate	EU OEL (Europe, 4/2004). Skin Notes: Indicative STEL: 333 mg/m ³ 15 minute(s). Form: All forms STEL: 50 ppm 15 minute(s). Form: All forms TWA: 133 mg/m ³ 8 hour(s). Form: All forms TWA: 20 ppm 8 hour(s). Form: All forms
propan-2-ol	ACGIH (United States, 1994). TWA: 983 mg/m ³ STEL: 1230 mg/m ³ TWA: 400 ppm STEL: 500 ppm ACGIH TLV (United States, 1/2004). Notes: ACGIH 2003 Adoption Refers to Appendix A -- Carcinogens. STEL: 400 ppm 15 minute(s). Form: All forms TWA: 200 ppm 8 hour(s). Form: All forms
aluminium	ACGIH (United States). Notes: Respirable TWA: 5 mg/m ³ ACGIH TLV (United States). Notes: Total TWA: 15 mg/m ³ 8 hour(s). ACGIH TLV (United States, 1/2004). TWA: 5 mg/m ³ 8 hour(s). Form: All forms TWA: 10 mg/m ³ 8 hour(s). Form: Dust TWA: 5 mg/m ³ 8 hour(s). Form: Fume
carbon black	ACGIH TLV (United States, 1/2004). Notes: Substance identified by other sources as a suspected or confirmed human carcinogen. 1996 Adoption Refers to Appendix A -- Carcinogens. TWA: 3.5 mg/m ³ 8 hour(s). Form: All forms

- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hand protection	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Recommended: Neoprene gloves. Nitrile gloves.
Eye protection	: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.
Skin protection	: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

9. Physical and chemical properties

General information

Appearance

Physical state	: Liquid. (Viscous liquid.)
Color	: Various
Odor	: Characteristic.
Odor threshold	: Lowest known value: 43 ppm (propan-2-ol)

Important health, safety and environmental information

pH	: Not applicable
Boiling point	: >150°C (302°F)
Melting point	: May start to solidify at the following temperature: -63.45°C (-82.2°F) This is based on data for the following ingredient: 2-butoxyethyl acetate.
Flash point	: Closed cup: 32°C (89.6°F). (Tagliabue.)
Flammability (solid, gas)	: Flammable liquid
Explosive properties	: Explosive in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.
Explosion limits	: Greatest known range: Lower: 1.9% Upper: 36%
Vapor pressure	: Highest known value: 28.3 kPa (212 mm Hg) (at 20°C) (2-butoxyethanol).
Relative density	: 0.95 to 1.25 g/cm ³
Solubility	: Easily soluble in the following materials: methanol, diethyl ether, n-octanol, acetone. Insoluble in the following materials: cold water, hot water.
Octanol/water partition coefficient	: The product is much more soluble in octanol.
Vapor density	: Highest known value: 5.5 (Air = 1) (2-butoxyethyl acetate).
Evaporation rate (butyl acetate = 1)	: Highest known value: 1.7 (propan-2-ol) compared with butyl acetate

Other information

Auto-ignition temperature	: Lowest known value: 170°C (338°F) (cellulose nitrate).
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10. Stability and reactivity

Stability	: The product is stable.
Conditions to avoid	: Avoid all possible sources of ignition (spark or flame).
Materials to avoid	: Reactive or incompatible with the following materials: oxidizing materials, acids, alkalis.
Hazardous decomposition products	: Evolves toxic fumes when heated to decomposition.

11. Toxicological information

Potential acute health effects

Inhalation	: Harmful by inhalation.
Ingestion	: No known significant effects or critical hazards.
Skin contact	: Harmful in contact with skin. Irritating to skin.
Eye contact	: Irritating to eyes.

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
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2-butoxyethanol	LD50 Dermal	Rabbit	220 mg/kg	-
	LD50 Intraperitoneal	Rat	220 mg/kg	-
	LD50 Intravenous	Rat	307 mg/kg	-
	LD50 Oral	Rat	470 mg/kg	-
	LD50 Oral	Rat	917 mg/kg	-
	LD50 Unreported	Rat	917 mg/kg	-
	LDLo Oral	Rat	1500 mg/kg	-
	TDLo Unreported	Rat	250 mg/kg	-
	TDLo Oral	Rat	500 mg/kg	-
2-butoxyethyl acetate	LD50 Dermal	Rabbit	1500 mg/kg	-
	LD50 Oral	Rat	2400 mg/kg	-
propan-2-ol	LD50 Dermal	Rabbit	12800 mg/kg	-
	LD50 Intraperitoneal	Rat	2735 mg/kg	-
	LD50 Intravenous	Rat	1088 mg/kg	-
	LD50 Oral	Rat	5045 mg/kg	-
	LD50 Oral	Rat	5000 mg/kg	-
carbon black	TDLo Intraperitoneal	Rat	800 mg/kg	-
	LD50 Dermal	Rabbit	>3 g/kg	-
	LD50 Oral	Rat	>15400 mg/kg	-

Potential chronic health effects

Ingredient name	Carcinogenic effects	Mutagenic effects	Developmental toxicity	Impairs fertility
lead chromate molybdate sulfate red	Carc. Cat. 3; R40	-	Repr. Cat. 1; R61	Repr. Cat. 3; R62
lead sulfochromate yellow	Carc. Cat. 3; R40	-	Repr. Cat. 1; R61	Repr. Cat. 3; R62

Carcinogenicity : Contains material which may cause cancer, based on animal data. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Reproductive toxicity : Contains material which can cause birth defects.

Over-exposure signs/symptoms

Inhalation	: Inhalation of vapors may cause dizziness, an irregular heartbeat, narcosis, nausea or asphyxiation.
Ingestion	: Ingestion may cause nausea, weakness and central nervous system effects.
Skin	: Repeated skin exposure can produce local skin destruction or dermatitis.
Target organs	: Contains material which causes damage to the following organs: blood, kidneys, lungs, liver, lymphatic system, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea

12. Ecological information**Ecotoxicity data**

Ingredient name	Species	Period	Result	
titanium dioxide	Daphnia magna (EC50)	48 hour(s)	>1000 mg/l	
2-butoxyethanol	Lepomis macrochirus (LC50)	96 hour(s)	1490 mg/l	
propan-2-ol	Pimephales promelas (EC50)	48 hour(s)	10000 mg/l	
	Lepomis macrochirus (LC50)	96 hour(s)	>1400 mg/l	
	Pimephales promelas (LC50)	96 hour(s)	6550 mg/l	
	Pimephales promelas (LC50)	96 hour(s)	9640 mg/l	
	Pimephales promelas (LC50)	96 hour(s)	10400 mg/l	
	Pimephales promelas (LC50)	96 hour(s)	11130 mg/l	
	aluminium	Oncorhynchus mykiss (LC50)	96 hour(s)	0.12 mg/l
		Oncorhynchus mykiss (LC50)	96 hour(s)	0.16 mg/l
Oncorhynchus mykiss (LC50)		96 hour(s)	0.31 mg/l	

Other ecological informationPersistence/degradability

Ingredient name	BOD ₅	COD	ThOD
2-butoxyethanol	>1 gO ₂ /g [10 d]	-	-

Ingredient name	Aquatic half-life	Photolysis	Biodegradability
2-butoxyethanol	-	1 day(s).	Readily
2-Butoxyethyl acetate	9 to 70 day(s)	<1 day(s).	Inherent
propan-2-ol	3 to 29 day(s)	3.2 day(s).	Readily

Bioaccumulative potential




Ingredient name	LogP _{ow}	BCF	Potential
2-butoxyethanol	-	2.5	low
2-Butoxyethyl acetate	-	3	low
propan-2-ol	0.05	3	low

Other adverse effects : Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

13. Disposal considerations

Methods of disposal : Hazardous chemical waste.
Waste must be disposed to a landfill permitted in terms of the Department of Water Affairs and Forestry's minimum requirements for waste disposal to landfill, and the minimum requirements for the handling, classification and disposal of hazardous waste.

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
ADR / SANS 10228 Class	UN1210	PRINTING INK	3	III		Hazard identification number 30 Limited quantity LQ7 CEFIC Tremcard 30GF1-III of 30GF1-sp
IMDG Class	UN1210	PRINTING INK	3	III		Emergency schedules (EmS) F-E, S-D
IATA Class	UN1210	PRINTING INK	3	III		Passenger and Cargo Aircraft Quantity limitation: 60 L Packaging instructions: 309 Cargo Aircraft Only Quantity limitation: 220 L Packaging instructions: 310 Limited Quantities - Passenger Aircraft Quantity limitation: 10 L Packaging instructions: Y309

15. Regulatory information

SANS 10265 / EU Regulations

Hazard symbol or symbols :



Toxic, Dangerous for the environment.

Risk phrases :

- R10- Flammable.
- R40- Limited evidence of a carcinogenic effect.
- R61- May cause harm to the unborn child.
- R62- Possible risk of impaired fertility.
- R20/21- Harmful by inhalation and in contact with skin.
- R36/38- Irritating to eyes and skin.
- R33- Danger of cumulative effects.
- R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases :

- S53- Avoid exposure - obtain special instructions before use.
- S36/37- Wear suitable protective clothing and gloves.
- S61- Avoid release to the environment. Refer to special instructions/safety data sheet.

Contains :

- lead chromate molybdate sulfate red 235-759-9
- lead sulfochromate yellow 215-693-7

Product use :

- Classification and labeling have been determined according to EU Directives 67/548/EEC and 1999/45/EC (including amendments) and take into account the intended product use.
- Industrial applications.

16. Other information

Full text of R-phrases referred to in sections 2 and 3 - Europe : R11- Highly flammable.
R15- Contact with water liberates extremely flammable gases.
R10- Flammable.
R40- Limited evidence of a carcinogenic effect.
R61- May cause harm to the unborn child.
R62- Possible risk of impaired fertility.
R20/21- Harmful by inhalation and in contact with skin.
R20/21/22- Harmful by inhalation, in contact with skin and if swallowed.
R36- Irritating to eyes.
R36/38- Irritating to eyes and skin.
R33- Danger of cumulative effects.
R67- Vapors may cause drowsiness and dizziness.
R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Prepared by : GL Inks EHS

Notice to reader

This MSDS summarises at the date of issue our best knowledge of the health, safety and environmental hazard information related to the product and, in particular, how to safely handle, use, and transport the product in the workplace. Since GL Specialized inks (Pty) Ltd cannot anticipate or control the conditions under which the product may be handled, used, stored or transported, each user must, prior to usage, review the MSDS in the context of how the user intends to handle, use, store or transport the product in the workplace and beyond; and communicate such information to all relevant parties. If clarification, or further information is required to ensure that an appropriate assessment can be made, the user should contact the company.

We shall not assume any liability of the accuracy or completeness of the information contained herein, or any advice given, unless there has been gross negligence on our part. In such an event, or liability shall be limited only to direct damages suffered. Our responsibility for the product as sold is subject to our standard terms and conditions. All risk with possession and application of the product passes on delivery.