

# Material Safety Data Sheet

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

### PRODUCT NAME

3-Methoxy-3-methyl-1-butanol (MMB)

### COMPANY IDENTIFICATION

KURARAY CO., LTD.

CHEMICALS DIVISION

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## 2. COMPOSITION / INFORMATION ON INGREDIENTS

### CHEMICAL IDENTITY

Chemical name : 3-Methoxy-3-methyl-1-butanol (MMB) Min.98%  
Formula :  $(\text{CH}_3)_2 \text{C}(\text{OCH}_3)\text{CH}_2 \text{CH}_2 \text{OH}$   
CAS NO. : 56539-66-3

## 3. HAZARDS IDENTIFICATION

(See Section 11. TOXCOLOGICAL INFORMATION)

### EMERGENCY OVERVIEW

Transparent flammable liquid material with a slight odor. May cause eye irritation.  
Harmful if inhaled, or swallowed.

### POTENTIAL HEALTH EFFECTS:

Eye :May cause moderate eye irritation.

Skin :Prolonged or repeated exposure may cause slight skin irritation.

Inhalation:Not available

Ingesution:Not available

### SYSTEMIC (OTHER TARGET ORGAN) EFFECT:

Not available

### TERTOLOGY (BIRTH DEFECT)

Birth defects are unlikely

CARCINOGENICITY : Not available

NTC :Not listed

IARC :Not listed

OSHA :Not established

#### 4 . FIRST AID MEASURES

##### EYE :

Gently rinse the affected eyes with clean water for at least 15 minutes. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

##### SKIN :

Remove all contaminated clothing, shoes and socks from the affected areas as quickly as possible, cutting them off if necessary. Wash the affected area under tepid running water use a mild soap irritation persists. Arrange for transport to the nearest medical facility for examination and treatment by a physician.

##### INHALATION :

Remove the victim from the contamination immediately to fresh air. Keep the victim warm and quiet. If any symptoms may appear, arrange for transport to the nearest medical facility for examination and treatment as soon as possible.

##### INGESTION :

Do not induce vomiting, unless directed to do by medical personnel. Never give anything by mouth to someone who is unconscious or convulsing. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

##### NOTE TO PHYSICIAN :

No specific antidote, supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

#### 5 . FIRE-FIGHTING MEASURES

##### FLAMMABLE PROPERTIES :

Flash point: 154F (68°C)

Method used: TCC

Auto-ignition temperature: 743F (395°C)

##### FLAMMABLE LIMITS. (Vol.%):

Lower:1.2 Upper:13.1

##### HAZARDOUS COMBUSTION PRODUCTS :

Hazardous combustion products may include, and are not limited to carbon monoxide , carbon dioxide.

**EXTINGUISHING MEDEA :**

Water spray, foam, dry chemical powder or CO<sub>2</sub>.

**FIRE FIGHTING INSTRUCTIONS :**

Keep people away. Isolate fire area and deny unnecessary entry. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire.

Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves ). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

**6 . ACCIDENTAL RELEASE MEASURES**

(See Section 15. REGULATORY INFORMATION)

**PROTECT PEOPLE**

Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. For large spills, warn public of downwind explosion hazard. Check area with explosion meter before reentering area. Ground and bond all containers and handling equipment.

**PROTECT THE ENVIRONMENT**

Vapor explosion hazard, keep out of sewers.

**CLEANUP**

Absorb spill with inert material(e.g., dry sand or earth), then place in a chemical waste containers using unsparking tools. Flush residual spill(area) with copious amount of water. Ventilate area after material pick up is complete.

**7 . HANDLING AND STORAGE****HANDLING**

Use only in the well-ventilated areas. Avoid contact skins and eyes. Container ,even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. No smoking, open flames or sources of ignition in handling and storage area. Never use air pressure for transferring product. Electrically ground all equipment.

**STORING**

Store in a cool, dry, well-ventilated location. Keep away from all possible source of ignition. Keep containers tightly closed when not in use.

## 8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

### ENGINEERING MEASURE

Use in a totally enclosed system, or with local exhaust ventilation.

### PERSONAL PROTECTIVE EQUIPMENT

#### Eye/face Protection :

Use chemical goggles. If vapor exposure causes eye discomfort, use a full-face respirator

#### Skin Protection :

Use protective clothing impervious to this material. Selection of specific items such as face shield, gloves, boots, apron, or full-body suit will depend on operation.

Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse. Contaminated leather items, such as shoes, belts and watchbands, should be removed and destroyed.

#### Respiratory Protection :

When respiratory protection is required, use an approved air-purifying or positive-pressure supplied-air respirator depending on the potential airborne concentration.

### EXPOSURE GUIDELINE

ACGIH TLV and OSHA PEL are not established.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor : Transparent liquid. Slight odor.

Flash point: 154F (68°C)

Boiling Point : 345F (174°C)

Specific Gravity (H<sub>2</sub>O=1) : 0.927 @20°C/20°C

Melting Point : <-58F (-50°C)

Vapor Density (air): 4.1

Evaporation Rate (n-Butyl Acetate=100) : 7

Solubility in Water : Infinite

## 10. STABILITY AND REACTIVITY

### CHEMICAL STABILITY

Stable under recommended storage conditions.

### CONDITIONS TO AVOID

Avoid static discharge. Flammable vapors can be released at elevated temperatures.

### REACTIVITY

Not available.

### INCOMPATIBILITY WITH OTHER MATERIALS

Avoid contact with oxidizing materials.

#### HAZARDOUS DECOMPOSITION PRODUCTS

Dose not normally decompose.

HAZARDOUS POLYMERIZATION : Will not occur.

## 1 1 . TOXICOLOGICAL INFORMATION

(See Section 15. REGULATORY INFORMATION)

#### Acute Toxicity

Oral LD<sub>50</sub> : 4,300mg/kg(rats)<sup>i</sup>  
5,830mg/kg(mice)<sup>ii</sup>

Dermal LD<sub>50</sub> : >2,000mg/kg(rats)<sup>iii</sup>

No deaths occurred and no clinical signs were noted after a 24h dermal administration, under occlusion of MMB at a dose level of 2,000mg/kg.

#### Inhalation Toxicity after repeated dose (rats/500ppm/28days) <sup>iv</sup>

No significant changes were observed in the pathological, histological and functional examinations of viscera but a slight increase in GOT activity in liver and a slight increase in kidney weights as percentages of body weight. Other abdominal viscera, showed nothing wrong in other examination.

#### Mutagenicity(Reversion test with bacteria / Ames Test)<sup>v</sup>

No evidence of mutagenic potential.

#### Teratorogenicity<sup>vi</sup>

Developmental NOEL : 500mg/kg ·rat/day

Maternal NOEL : 200mg/kg ·rat/day

MMB is not a developmental toxicant, because there were no adverse effects on development at either of two dosages that were toxic to the dams.

#### Skin Sensitization Potential<sup>vii</sup>

Negative responses noted in all test and control group animals following challenge with main ingredient of MMB at concentration of 100%.

#### Primary Skin Irritation (in rabbits)<sup>viii</sup>

MMB is non-irritant to rabbit's skin under the test conditions.

Mean irritation scores

MMB 100% : 0.04

MMB 50% v/v in distilled water : 0.00

Very slight erythema was noted at one test site treated with MMB at a concentration of 100% at the 24h assessment only.

#### Dermal Irritation (28 day repeat, in rabbits)<sup>ix</sup>

MMB 100% : 0.6

MMB 50% v/v in distilled water :0.0

**Photoirritation Potential (in guinea pigs)\***

No photoirritant responses were noted in the test and control groups.

**Photosensitization Potential (in guinea pigs)<sup>xi</sup>**

None of the group animals showed a positive response.

**Human Skin Patch Test<sup>xii</sup>**

Negative: 48h male and female

**Primary Eye Irritation (in rabbits)<sup>xiii</sup>**

MMB is moderately irritant to rabbit eyes, however, 30-60s after instillation with distilled water reduces the irritation potential of MMB. The non-rinsed eyes showed some responses, and returned to normal by 9-10 days post instillation.

**1 2 . ECOLOGICAL INFORMATION****Biodegradability<sup>xiv</sup> : MMB is biodegradable**

MMB (30ppm) was stirred with bacterial sludge(100ppm) at 25C for 4 weeks, then MMB (88%) was biologically oxidized.

**Biomagnification in fish<sup>xv</sup> : No magnification (carp, 8 weeks)****Acute Toxicity for fish<sup>xvi</sup> : TLm 7,400 ppm (killifish, 48hrs)****Chemical Oxygen Demand(COD)<sup>xvii</sup> :**

8,060mg/L (1% aqueous solution of MMB)

**1 3 . DISPOSAL CONSIDERATIONS****DISPOSAL**

Do not dump into any sewers, on the ground, or into any body of water. All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.

**FOR UNUSED AND UNCONTAMINATED PRODUCT**

The preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destruction device.

**NOTICE** : KURARAY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2.

**1 4 . TRANSPORTATION INFORMATION**

UN No. : Not applicable

IMDG Status : Not applicable

Tarif Code : 2909.49

DEPARTMENT OF TRANSPORTATION (D.O.T) :

For DOT regulation information, if required, consult transportation regulation, product shipping papers.

CANADIAN TDG INFORMATION :

For TDG regulatory information, if required, consult transportation regulation, product shipping papers.

NOTICE :ANY TRANSPORTATION PRACTICE MUST BE IN COMPLIANCE WITH LAWS AND REGULATION IN YOUR COUNTRY OR REGION.

## 1 5 . REGULATORY INFORMATION

NOTICE :

THE INFORMATION HEREIN IS PRESENTED IN GOOD FAITH AND BELIEVED TO BE ACCURATE AS OF THE EFFECTIVE DATE SHOWN ABOVE. HOWEVER, NO WARRANTY, EXPRESS OR IMPLIED IS GIVEN. REGULATORY REQUIREMENTS ARE SUBJECT TO CHANGE AND MAY DIFFER FROM ONE LOCATION TO ANOTHER; IT IS THE BUYER'S RESPONSIBILITY TO ENSURE THAT ITS ACTIVITIES COMPLY WITH FEDERAL, STATE OR PROVINCIAL, AND LOCAL LAWS AND REGULATIONS. SEE OTHER SECTIONS FOR HEALTH AND SAFETY INFORMATION.

### U.S. FEDERAL REGURATION

Clean Air Act: HAP :

MMB is not hazardous air pollutants(HAP),as definds by U.S. Clean air Act.

Clean Air Act: ODS :

MMB neither is, nor was manufactured with a Class I or II ozone depleting substance(ODS).

SARA Title III: Section 302:

MMB is not regulation under Section 302 as extremely Hazardous substances.

SARA Title III: Section 304:

MMB is not regulation under Section 302 as extremely Hazardous chemicals for emergency release notification( "CERCLA " LIST).

SARA Title III: Section 311-312: Hazard Category:

MMB is considered hazardous under the OSHA Hazard Communication Standard (HCS) and is regulated under Section 311-312 (40 CFR 370).  
Its hazard is "Fire Hazard"

SARA Title III: Section 313:

MMB is not the substance requiring annual routine Toxic Chemical Release Reporting under Section 313.

TSCA Section 8 (b): Inventory

TSCA inventory : Listed (56539-66-3)

OSHA HAZARD COMMUNICATION STANDARD

MMB is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

### U.S. STATE REGULATIONS

State Right-to-know:

This product is not known to contain any substances subject to the disclosure requirements of

New Jersey

Pennsylvania

### CANADIAN REGULATIONS

CDLS (Canadian Domestic Substances List):  
listed

### EUROPIAN REGULATIONS

EINECS (European Inventory of Existing Commercial Substances):  
listed

### OTHER COUNTRY'S REGULATIONS

Japanese Inventory:

MITI (Ministry of International Trade and Industry List of Existing and New Chemical Substances)

Australian Inventory: AICS (Australian Inventory of Chemical Substances)  
listed

Korean Inventory: KCSL (Korean Chemical Substances List)  
listed

## 1 6 . OTHER INFORMATION

ALL DATA PRESENTED HEREIN IS BASED ON ACTUAL MEASUREMENTS PERFORMED BY KURARAY CO., LTD. ALL INFORMATION CONTAINED HEREIN IS PRESENTED IN GOOD FAITH AND WITHOUT WARRANTY. KURARAY CO., LTD. ACCEPTS NO LIABILITY FOR DAMAGE OR LOSS FROM THE USE OR MISUSE OF THIS INFORMATION.

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- <sup>i</sup> Huntingdon Research Centre Ltd./UK  
<sup>ii</sup> Japan Industrial Safety Association  
<sup>iii</sup> Inveresk Research International Ltd./UK.. Meeting Japanese Ministry of Agriculture, Forestry and Fisheries Testing Guidelines for Toxicity Studies.  
<sup>iv</sup> Japan Industrial Safety Association  
<sup>v</sup> Huntingdon Research Centre Ltd./UK  
<sup>vi</sup> Argus Research Laboratory Inc./USA  
<sup>vii</sup> Inveresk Research International Ltd./UK.. Magnusson-Kligman maximization test in guinea pigs; meeting OECD and EEC test guidelines.  
<sup>viii</sup> Inveresk Research International Ltd./UK.. Meeting EPA guidelines, Ref. : US EPA Pesticide Assessment Guidelines Subdivision F, 81-4  
<sup>ix</sup> Inveresk Research International Ltd./UK..  
<sup>x</sup> Inveresk Research International Ltd./UK..  
<sup>xi</sup> Inveresk Research International Ltd./UK.. The Method was based on that of Harber, Armstrong and Ichikawa  
<sup>xii</sup> Nihon Mouhatsu Kagaku Kyokai /JAPAN  
<sup>xiii</sup> Nihon Mouhatsu Kagaku Kyokai /JAPAN Meeting EPA guidelines, Ref. : US EPA Pesticide Assessment Guidelines Subdivision F, 81-4  
<sup>xiv</sup> Chemicals Inspection & Testing Institute, JAPAN Japanese MITI-2 test condition, evaluated by OECD criteria  
<sup>xv</sup> Chemicals Inspection & Testing Institute, JAPAN  
<sup>xvi</sup> Chemicals Inspection & Testing Institute, JAPAN Meeting JIS-K-0102-55  
<sup>xvii</sup> Japan Oil Stuff Inspectors Corporation, Inc.