

Material Safety Data Sheet

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

3-Methoxy-3-Methyl-1-Butyl Acetate (MMB-AC)

COMPANY IDENTIFICATION

KURARAY CO., LTD.

CHEMICALS COMPANY

1-6, 3-chome, Nihonbashi, Chuo-ku, Tokyo 103-8254, Japan

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2. COMPOSITION / INFORMATION ON INGREDIENTS

CHEMICAL IDENTITY

Chemical name : 3-Methoxy-3-Methyl-1-Butyl Acetate (MMB-AC) Min.98%
Formula : $C_8H_{16}O_3$
CAS NO. : [103429-90-9]

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

Ingestion:Not available

SYSTEMIC (OTHER TARGET ORGAN) EFFECT:

Not available

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: 168F (75.5°C)

Method used: TCC

Auto-ignition temperature: 780.8F (417°C)

FLAMMABLE LIMITS. (Vol.%):

EXTINGUISHING MEDEA :

Water spray, foam, dry chemical powder or CO₂.

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.

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. Mild odor.

Flash point: 168F (75.5°C)

Boiling Point : 370F (188°C)

Specific Gravity (H₂O=1) : 0960 @20°C/4°C

Melting Point : <-122F (-50°C)

Vapor Density (air): 5.6

Evaporation Rate (n-Butyl Acetate=100) : 10

Solubility in Water : 6.80 wt.% in water

5.70 wt.% water in

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

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 LD₅₀ : 4.6 g/kg(rats) i

Dermal LD₅₀ : >2.0g/kg(rats) ii

No deaths were observed at dose of 2.0 g/kg.

Dermal irritation: Very slight erythema (score 1) was observed, which was fully (rabbits) recovered at 48h after patch removal. iii

Sensitization: Skin Negative(Magnusson-Kligman) iv
(guinea pigs)

Eye irritation: MMB-AC is slightly irritant. v
(rabbits)

Mutagenicity vi
Ames test Negative

【Reference】

MMB-AC may degradate to MMB and Acetic Acid. Followings are the Date of MMB.

Inhalation Toxicity after repeated dose (rats/500ppm/28days) vii

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 viii
Ames test Negative

Teratorogenicity ix

Developmental NOEL : 500mg/kg ·rat/day

Maternal NOEL : 200mg/kg ·rat/day

MMB is not a developmental toxicant in the rat and mouse.

main ingredient of MMB at concentration of 100%. (Magnusson-Kligman)

Primary Skin Irritation (in rabbits) xi

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) xii

MMB 100% : 0.6

MMB 50% v/v in distilled water : 0.0

Photoirritation Potential (in guinea pigs) xiii

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

Photosensitization Potential (in guinea pigs) xiv

None of the group animals showed a positive response.

Human Skin Patch Test xv

Negative: 48h male and female

Primary Eye Irritation (in rabbits) xvi

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

Chemical Oxygen Demand(COD) xvii :

6,040mg/L (1% aqueous solution of MMB-AC)

5,210mg/L (COD after aeration of MMB-AC:Aerated for 16hours at 1.5L/min.)

Biological Oxygen Demand(BOD) xviii :

365mg/L (Measured value for a 1,000mg/L solution of MMB-AC)

【Reference】

MMB-AC may degradate to MMB and Acetic Acid. Followings are the Date of MMB.

Biodegradability : MMB is biodegradable xix

MMB (30ppm) was stirred with bacterial sludge(100ppm) at 25C for 4 weeks, then

MMB (88%) was biologically oxidized.

Chemical Oxygen Demand(COD) xxii :

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

8,020mg/L (COD after aeration of MMB:Aerated for 16hours at 1.5L/min.)

Biological Oxygen Demand(BOD) xxiii :

5.0mg/L (Measured value for a 1,000mg/L 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

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

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.

【Reference】

MMB-AC may degradate to MMB and Acetic Acid. Followings are the Date of MMB.

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 TitleIII: Section 302:

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

SARA TitleIII: Section 304:

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

SARA TitleIII: 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 TitleIII: 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 STANDERD

Communication

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

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 REGURATIONS

EINECS (European INventory of Existing Commercial Substances):
listed

OTHER CONTORY'S REGURATIONS

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.

- i Huntingdon Research Centre Ltd./UK
- ii Inveresk Research International Ltd./UK..
- iii Inveresk Research International Ltd./UK..
- iv Inveresk Research International Ltd./UK.. meeting OECD and EEC test guidelines.
- v Inveresk Research International Ltd./UK..
- vi Japan Oil Stuff Inspectors' Corporation
- vii Japan Industrial Safety Association
- viii Huntingdon Research Centre Ltd./UK

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- xiii Inveresk Research International Ltd./UK..
- xiv Inveresk Research International Ltd./UK.. The Method was based on that of Harber, Armstrong and Ichikawa
- xv Nihon Mouhatsu Kagaku Kyokai /JAPAN
- xvi Nihon Mouhatsu Kagaku Kyokai /JAPAN Meeting EPA guidelines, Ref. : US EPA Pesticide Assessment Guidelines Subdivision F, 81-4
- xvii Japan Oil Stuff Inspectors' Corporation
- xviii Japan Oil Stuff Inspectors' Corporation
- xix Chemicals Inspection & Testing Institute, JAPAN Japanese MITI-2 test condition, evaluated by OECD criteria
- xx Chemicals Inspection & Testing Institute, JAPAN
- xxi Chemicals Inspection & Testing Institute, JAPAN Meeting JIS-K-0102-55
- xxii Japan Oil Stuff Inspectors' Corporation
- xxiii Japan Oil Stuff Inspectors' Corporation