

**1. Material and company profile**

Name of the material : Methyl ethyl ketone
Other names :
Suggestion and restriction on use : Nitrocellulose coating and vinyl coating solvent, resin, de-coating agent, curing agent and bonding agent, organic synthesizing, cleaning. Liquid; printing, catalyst carrier, acrylic paint. Note : insoluble for cellulose acetate and wax.
Name, address and phone number of manufacturer or supplier : NIPPON KAIJI KENTEI KYOKAI 1-Chrome Hatchobori, Chuo-ku, Tokyo 104-0032, Japan
Emergency contact number/ Fax : 81-3-3552-1257

**2. Information on hazards identification**

Classification of hazards : Level 2 flammable liquid, level 5 acute toxic (swallowing), level 3 corrosion /skin-irritation material, level 2A serious injury / eye-irritation material, level 2 specific targeted organ system toxics ~ level 2 repeated exposure, level 2 inhalable hazards

Content designation :



Symbol : Flame, exclamation mark, health hazards

Warning remark : dangerous

Hazard warning message :

Highly flammable liquid and vapor

May be harmful if swallowed

Cause minor skin irritation

Cause severe eye irritation

Long-term exposure may damage nerve, liver

May be harmful if swallowed and get into respiratory tract

Hazard prevention measures :

Place containers in a well ventilated area

Keep away from ignition sources - No smoking

If feel sick, get medical attention (show this label to medical staff)

Avoid prolonged exposure

Other hazards :

Transportation hazard label



Classification of hazards : 3  
(flammable liquid)

**3. Information on composition identification****Pure substance :**

English name : (Methyl ethyl ketone)
Synonyms : MEK, 2-Butanone, Ethyl methyl ketone, Methyl acetone, Methyl-2-propanone, Ethyl methyl cetone, Butanone
CAS No. : 78-93-3
Components of hazard (percentage) : 100

**4. First aid measures****First aid measures for different exposure means :**

Inhale → Enter : 1. Remove source of contamination or remove the patient to fresh air. 2. If the patient is not breathing, give CPR immediately. 3. Send to hospital immediately.
Skin contact : 1. Rinse the skin area with lukewarm water slowly at least for 5 minutes. 2. Take a shower and take off contaminated clothes, shoes and leather goods (belt, watchband) while showering. 3. Rinse repeatedly if irritation reaction appears.
Eye Contact : 1. Open eyelid(s) and rinse eye(s) with lukewarm water slowly. 2. Avoid other body parts contacting with contaminated water 3. Send to hospital immediately. 4. Get medical attention immediately.
The most important symptoms and hazardous effects : irritation, exceptionally high concentration may cause loss of consciousness or even death
Protection for the first aid personnel : C-class protective equipment should be worn, Do first aid in a safe area.
Tips for physicians : consider to give gastric lavage and activated charcoal if patient swallowed hazards.

**5. Fire fighting measures**

Applicable extinguishing agent : carbon dioxide
Unusual hazards may be encountered at fire fighting : 1. Highly flammable, the material is easily ignited at room temperature. 2. Vapor is heavier than air, it can disperse to a far distance, and can cause backdraft if contacts with fire. 3. Toxic gas may release from the fire scene. 4. May accumulate in a confined space and result in highly flammable toxic hazard. 5. Concentrated solution could also be flammable.
Special fire fighting procedure : Remove containers away from the fire scene and put out the fire at upwind area. 2. Stop leakage first without endangering the safety of the personnel, as the vapor could mix with air and ignite again. 3. If leakage can't be stopped, the surrounding area is wide open, let the fire burn. 5. It is not recommended to put out fire with mist, but it is acceptable to spread mist on the surface of the containers to cool down, disperse and dilute the hazardous vapor. 5. When the material storage area is on fire, non-manual controlled water hose controller or an automatic

swing fire aim should be used to put out fire; if not feasible, all personnel should withdraw from the scene and let the fire burn. 6. All personnel should leave the fire scene when the safety valves start making sounds or the color of containers changes °

Special protective equipment for fire fighters : fire fighters must wear air breathing apparatus, protective gloves and fire suits.

## 6. Accidental release measures

Individual precautions : 1. Restriction on access to hazardous area before the contaminated area is completely cleaned up. 2. Ensure clean-up work is done by trained personnel. 3. Wear appropriate personal protective equipment.

Environmental precautions : 1. Conduct ventilation and air exchange. 2. Put out and remove all ignition sources. 3. Inform related government health and safety units and environmental protection agencies.

Clean-up procedures :

1. Restriction on access to the scene, until spill area is completely cleaned up. 2. Make sure clean-up work is done by trained personnel. 3. Wear appropriate personal protective equipment. Environmental precautions : 1. Conduct area ventilation and air exchange. 2. Put out or remove all ignition sources. 3. Report to related government safety and health units and environmental protection agencies. Clean-up method : 1. Do not touch the leaked material. 2. Avoid leakage getting into sewer, drainage or confined space. 3. Try to prevent or reduce leakage in a safe condition. 4. Use sand, dirt or other materials that will not react with the leaked material to absorb the leakage. 5. A small amount of leakage : Use materials that will not react with the leaked material to absorb the leakage. Contaminated absorption is as hazardous as the leakage, it needs to be placed in a sealed and labeled container, wash off the leakage area with water. Small amount of leakage can be diluted with large amount of water. 6. Large amount of leakage : Contact the fire department, emergency treatment unit and supplier for assistance.

## 7. Safety disposition and storage measures

Disposition :

1. This material is a flammable and toxic liquid, personal protective equipment should be used and engineering control should be applied when dispose the material. People working on the disposition should be properly trained and informed about the danger of the material and safety measures. 2. Remove all ignition sources and keep the material away from heat and incompatible materials. 3. Work area should have "No Smoking" signs. 4. Liquid will accumulate charge; additional design should be taken into consideration to increase conductivity. For example, all the tanks, turn containers and pipelines must be grounded, grounding must come into contact with bare metal; during the operation, the flow rate should be lowered to increase operating time, and increase the time liquid stays in the pipelines or operate at low temperature. 5. When the deployment operation is not done in a confined system, ensure the mixing container and the receiving transportation equipment and containers are connected equipotentially. 6. Hazardous residue could still remain in empty tanks, containers and pipelines; welding, cutting, drilling or other heating work are not permitted before cleaning. 7. Tanks or storage containers can be filled with inert gas to reduce the risk of fire or explosion. 8. A non-sparking ventilation system should use at workplace and the equipment should be explosion-proof. 9. Keep aisles and exits unimpeded. 10. Consider to install leakage and fire detecting system, and appropriate automatic fire extinguishing system or adequate

equipment for emergency treatment in the storage area or in a busy operation area. 11. Avoid droplets or vapors coming from the operation; work at a designated area with good ventilation and adopt the minimum amount of use; operational area should be separated from storage area. 12. Wear appropriate personal protective equipment when necessary to avoid contact with the chemical or contaminated equipment. 13. Do not use the material with incompatible materials (such as strong oxidizers) to prevent from the risks of fire and explosion. 14. Use storage containers made of compatible materials, be careful not to spill the material when make subpacking. 15. Do not transport the liquid by pressurizing it with air or inert gas in the container. 16. Do not prepare the material at the storage area unless the deployment area is isolated by a fire-resistant structure. 17. Use approved flammable liquid storage container and deployed equipment. 18. Do not put contaminated liquid back into the original storage container. 19. Container must be marked, keep it tight when not in use and avoid damage. 20. Stored in a cool, dry, well ventilated place and no direct exposure to sunlight; away from heat, ignition sources and incompatible materials. 21. Storage equipment should be built by fire-resistant materials. 22. Floor should be made of impermeable materials so as to avoid self-absorption. 23. A slop or threshold should be set at the door or dig a trench so that leakage can be discharged to a safe place.

Storage :

1. Storage area should be clearly marked without any obstacles, only designed or trained personnel are permitted to enter the area. 2. Storage area should be separated from work area: away from elevator, building, exits or main passages. 3. Fire extinguishing agents and leakage cleaning equipment should be installed near the storage area. 4. Check containers for damage or leakage on a regular base. 5. Check all new containers if they are labeled appropriately and not damaged. 6. Limited storage. 7. Store the leaked material in a container made of compatible materials. 8. Storage containers should be grounded and equipotentially connected with other equipment. 9. All containers storing flammable liquid should have relief valves and vacuum release valves. 10. Store the material at the temperature suggested by the manufacturer or supplier; install temperature detector to indicate if temperature is too high or too low if necessary. 11. Avoid large amount of storage in a room, try to store in an isolated, fire-proof building. 12. Flame-proof equipment should be added on the exhaust pipe of the storage tank. 13. Storage tank must be ground-type, the bottom of the whole tank should be sealed to prevent leakage, the storage tank should be surrounded by an anti-liquid embankment that is able to block the entire capacity.

**8. Exposure preventive measures**

Engineering control : local exhaust or general ventilation devices			
Control parameters			
TWA	STEL	CEILING	BEIs
<b>200ppm</b>	<b>250ppm</b>	—	MEk in the urine after work is 2mg/L

## Personal protective equipment :

## Respiratory protection :

1. Lower than 3000 ppm : including chemical filter tank type with organic vapor filter tank, power air purification type, gas type, and self-contained breathing apparatus.
2. Unknown concentration : Positive pressure self-contained breathing apparatus and positive pressure air supply respirator supported by positive pressure self-contained respiratory
3. Escape : gas mask with organic vapor filter, escape-type self-contained breathing apparatus

Hand protection : 1. Impervious gloves, suggested materials : butyl rubber, Teflon, 4H, Barricale or Chemrel.

Eye protection : 1. Mask (minimum 8 inches). 2. Splash-proof safety goggles. 3. Do not wear contact lens.

Skin and body protection : 1. Chemical protective clothing.

## Protective equipment used

Respiratory protection : Gas mask with organic vapor filter.

Hand protection : Impervious gloves with butyl rubber texture.

Eye protection : Chemical splash-proof safety goggles.

Skin and body protection : Chemical protective clothing.

## Hygiene procedures :

1. Take off contaminated clothing immediately after work, wash the clothing before wearing and discarding.
2. No smoking, eating or drinking is permitted in workplace.
3. Wash hands thoroughly after handling the contamination.
4. Keep workplace clean.

**9. Physical and chemical nature**

Appearance : colorless, transparent liquid odor	Odor : Acetone smell
Odor threshold value : 2-85ppm(inspected), 5.4-55ppm (observed)	Melting point : <b>-86.3°C</b>
pH : -	Boiling point/ Boiling range : 79.6 °C
Flammability ( solid, gas ) : -	Flash point : -6~-2°C
Decomposition temperature : -	Testing method : Close cup
Ignition temperature : <b>404 °C</b>	Explosion limits : 1.8%~10%
Vapor pressure : <b>77.5 mmHg @ 20°C</b>	Vapor density : <b>2.41 (air=1)</b>

Density : <b>0.805 (water=1)</b>	Solubility : <b>26.8~29 mg/100ml (water)</b>
Octanol/ water partition coefficient ( log Kow ) : <b>0.29</b>	Rate of vaporization : <b>2.7 ( ether=1 )</b>

**10. Stability and reactivity**

Stability : stable in a normal condition.

## Hazardous reactions in a particular condition :

1. Stable in a normal condition; however, because it can form peroxides, it may explode in a long storage period

<p>or exposure in air or heat, therefore, it should be kept away from flames, sparks, static electricity, heat or other ignition sources. 2. Oxidants (such as peroxide, nitrate, perchlorate) : increase the risks of fire or explosion. 3. Strong acid (such as fuming sulfuric acid, chlorosulfonic acid) : will react and generate heat and pressure. 4. Mixture contains chlorine-based solvents (such as chloroform) and alkali (e.g. potassium hydroxide) : violent or explosive reaction. 5. Hydrogen peroxide and nitric acid mixture : It may be overheated and explode, as it will form peroxides (to vibration and heat sensitivity). 6. Tedin hydroxide solid : once contact with MEK liquid or vapor, it will ignite within 0.5 (1 minute). 7. 2-propanol : the alcohol will be peroxidized immediately under light; the mixture will explode if heated.</p>
<p>Conditions to avoid : 1. Stable in a normal condition; however, because it can form peroxides, it may explode in long-term storage or exposure in air or heat; therefore, it should be kept away from flames, sparks, static electricity, heat or other ignition sources.</p>
<p>Materials to avoid : strong acid (such as fuming sulfuric acid, chlorosulfonic acid), chlorine-based solvents (such as chloroform) mixture, alkali (e.g. potassium hydroxide), Hydrogen peroxide and nitric acid mixture, Tedin potassium hydroxide solid, 2 - propanol</p>
<p>Hazardous decomposed materials : explosive peroxides, such as methyl ethyl ketone peroxide</p>

## 11. Information on Toxicity

<p>Exposure means : skin, inhalation, swallow, eye</p>
<p>Symptoms : headache, dizziness, fatigue, vomiting, irritation</p>
<p>Acute toxicity :</p> <p>Skin : 1. cause minor irritation.</p> <p>Inhalation: 1. 100~200 ppm will cause nose, throat irritation. Higher concentration may depress central nerve and cause headache, nausea, dizziness and fatigue.</p> <p>2. Unexceptional high concentration may cause unconsciousness, or even death.</p> <p>Swallow : 1. Same effect as inhalation. °</p> <p>Eye : 1. Vapor will cause irritation.</p> <p>LD50(test on animals, routes of absorption) : 2740 mg/kg (rats, swallow)</p> <p>LC50(test on animals, routes of absorption) : 11300 ppm /4H (rats, inhale)</p> <p>500mg/24H (rabbits, skin) : caused moderate irritation.</p>

<p>Slow toxicity or long-term toxicity :</p> <p>1. Affect nerve, liver and skin. °</p> <p>3000ppm/7H (female mice pregnant for 6-15 days, inhalation) caused abnormal embryonic development.</p>
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## 12. Information on Ecology

Eco toxicity : LC50 (fish) : 1690-5640mg/l/96H  
 EC50 (aquatic invertebrates) : -  
 Bio-concentration coefficient (BCF) : 1

**Durability and degradability :**

1. Most of the MEK will turn into acetate in the body after the metabolism, and then broke down to carbon dioxide and water, and discharged through breathing and urination; small amount of MEK could also be discharged through breathing and urination. MEK and its metabolites can be fully discharged from the body within 24 hours.

2. MEK will be almost totally broken down when using activated sludge or in an aerobic condition.

3. If release into the water, MEK will vaporize in air, half-life remains about 3-12days.

4. If release into the air, MEK will work with hydroxyl radicals, half-life remains 2.3 days.

Half-life (air) : 64.2~642 hours

Half-life (water surface) : 24~168 hours

Half-life (groundwater) : 48~336 hours

Half-life (soil) : 24~168 hours

Bioaccumulation : -

Liquidity in soil : if release into the soil, some will vaporize and some will infiltrate into the ground.

Other adverse effects : -

### 13. Waste disposal measures

Waste disposal measures :

1. Handle the waste disposal according to current regulations.
2. Consider to bury the waste disposal in landfill in a sanitary way or burn it in a qualified solvent incineration plant.

### 14. Information on transport

UN Code : 1193

UN Transport Name : Butanone

Transport hazard classification : Class 3 flammable liquid

Packaging category : II

Marian pollutant (Yes/ No) : No

Special transport method and precautions :

### 15. Information on regulations

Applicable regulations

1. Rules of Labor Safety and Health Installations
2. Regulation of Labeling and Hazard Communication of Dangerous and Harmful Materials.

3. Organic Solvent Poisoning Prevention Rules.
4. Standard for the Allowable Concentration of the Hazards in the Air of the Labor's Work Environment.
5. Rules of Road Traffic Safety.
6. Industrial Waste Storage, Clearance and Processing Methods and Facility Standards.
7. Public Hazardous Materials and Flammable Pressurized Gases Establishment Standards and Safety Management Regulations

**16. Other information**

Reference	1.CHEMINFO database, CCINFO CD-Rom, 2005-3 2.RTECS database, TOMES PLUS CD-Rom, · Vol65, 2005 3.HSDB database, TOMES PLUS CD-Rom, Vol65,2005 4.ChemWatch database, 2005-1	
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