Number: 007

Section 1. Product and Company Identification

Product name: Formaldehyde 37%
Synonyms: -
Recommended use and Restrictions on use: Urea and melamine resin; poly acetal resin; Phenol resin; Ethylene glycol; pentaerythritol; methenamine; fertilizer; dyestuffs; medicine (disinfectant; bactericide); antiseptic spices; preservative; curing agents; reducing agent of the silver and gold; anti-corrosive agents of oil well; durable compression treatment that of fabric fiber; commercial sterilization disinfectant; treatment of the granulous soot.
Manufacturer, Importer, or Supplier: Shiny Chemical Industrial Co., Ltd. Address: No.5, Yeong Gong 1stRd, Yeong An Dist., Kaohsiung 82841, Taiwan, R.O.C. Telephone: +886-7-8619171 ext. 711~714
Emergency telephone number: +886-7-8619171 ext. 711~714 Fax: +886-7-6222620

Section 2. Hazards Identification

Classification:

1. Carcinogenicity: Category NO.1
2. Flammable Liquids: Category NO.4
3. Serious Eye Damage/Eye Irritation: Category NO.1
4. Skin Sensitization: Category NO.1
5. Acute Toxicity: Oral Category NO.3
6. Acute Toxicity: Skin Category NO.3
7. Acute Toxicity: Inhalation Category NO.2
8. Skin Corrosion/Irritation: Category NO.1
9. Germ Cell Mutagenicity: Category NO.2

Label elements:

Hazard pictograms: Corrosion, Toxicity, Health Hazards

Signal word: Danger

Hazard Statements:

1. May cause cancer.
2. Combustible liquid.

3. Causes serious eye damage.
4. May cause an allergic skin reaction.
5. Toxic if swallowed.
6. Toxic in contact with skin.
7. Fatal if inhaled.
8. Causes severe skin burns and eye damage.
9. Suspected of causing genetic defects.

Precautionary statements:

1. Keep containers in a well-ventilated place.
2. Do not breathe gas/fumes/vapor/mist.
3. If contacted with eyes, flush with plenty of water before seek for medical attention.
4. Wear appropriate protective clothing.

Other Hazards: -

Section 3. Composition/Information on Ingredients

Mixture

Chemical properties: -

Chemical Name	CAS No.	Concentration or Concentration Range (Composition Percentage)
Formaldehyde	50-00-0	37% W/W
Methyl alcohol	67-56-1	4.5% W/W

Section 4. First Aid Procedures

Description of first aid measures:

• Inhalation:

1. Ensure self-safety based protection procedures before rescue.
2. Remove contamination sources or move victims to fresh air.
3. If breathing hard, have trained personnel administer oxygen under the direction of a doctor.
4. Get medical attention immediately.

• Skin contact:

1. Don't touch this material directly. Wear leak-proof gloves if necessary.
2. Remove contaminated clothing, shoes, and leather (watchstraps and belts).
3. Wash contaminated sites tenderly with warm water for at least 20 minutes.
4. Get medical attention immediately if irritation persists.
5. Clean contaminated clothing, shoes, and leather thoroughly before reuse or abandon. Don't use contaminated shoes or leather.

• Eye contact:

1. Immediately lift eyelids, flushing eyes with plenty of water for at least 20 minutes until removing contaminated materials. 2. Avoid flushing to the unaffected eye. 3. Wash repetitively if irritation persists. 4. Get medical attention immediately. • Ingestion: 1. Never give anything by mouth to victims will soon lose consciousness or lose consciousness already or with the convulsion. 2. Have conscious victims gargle thoroughly with clear water. 3. Don't induce vomiting. Have victim drink 240 ~ 300 mL of water. 4. If vomiting occurs, lean victim forward to reduce the risk of ingesting vomitus, and repeat gargling. 5. Have victims gargle and repeat administering water. 6. Get medical attention immediately.
The most Important Symptoms and Hazardous Effects: Irritation, burning, allergy.
Protection for emergency personnel: Use appropriate personal protective equipment such as class C clothing to take first aid in a safety area.
Notes to Physicians: Avoid gastric lavage and activated carbon.

Section 5. Firefighting Measures

Suitable extinguishing media: Carbon dioxide, chemical dry, alcohol foam, water mist, polymer foam.
Special hazards during firefighting: This gas reacting with air will produce flammable and explosive mixtures.
Firefighting procedures: Use water mist to cool containers in a fire scene.
Protective equipment for firefighters: Extinguishing staffs should wear respirators protective gloves, and firefighting clothing.

Section 6. Accidental Release Measures

Personal precautions: 1. Restrain personnel close to the spill area before totally cleaning out. 2. Confirm the cleaning work be responsible by trained staffs. 3. Wear appropriate personal protective equipment.
Environmental precautions: 1. Ventilate spilled area. 2. Remove all sources of ignition. 3. Report to governmental safety and hygiene institutes and related units.
Methods for cleaning up: 1. Do not touch spilled material.

2. Avoid leaks flushing to sewers or confined areas.
3. Try to stop or reduce leaks in safety condition.
4. Use sand, soil, and inert absorbing agents to block leaks.
5. Small spill: Use the material, not react with spill, to absorb. Contaminated absorbing agents have same risk as spill. Place in covered and labeled containers. Spray water on spilled areas. Use plenty of water to dilute small spill.
6. Large spill: Contact fire control, urgent handling units and suppliers to seek aid.
7. Use water spray to disperse vapor and protect leaking-stop personnel.
8. Staffs should have appropriate protective apparatus.

Section 7. Handling and Storage

Handling:

1. Use approved storage containers in workplace.
2. Storage barrels should connect with earth by using same potential while transferring and packaging (earth clip should connect with naked metal).
3. Keep away from sparks, flames and other igniting sources and have a "No smoking" sign in workspace.
4. Operate in well-ventilated assigned place and adopt the minimum consumption. Avoid mist or vapors releasing.
5. Prepare urgent emergency devices for extinguishing and spill management.
6. Containers must be labeled and closed tightly when being unnecessary; there may be harmfulness residues in the empty barrel.

Storage:

1. Store in shady, cool, dry, and well-ventilated place that sunshine cannot directly illuminate.
2. Keep away from heat, ignition sources, and incompatible substances, such as oxidants and alkali.
3. Use spark-proof earthed ventilating system and electric equipment to avoid becoming igniting source.
4. Storage in appropriate and labeled containers and prevent from being damaged.
5. Close containers not in use and empty barrels tightly.
6. Store in appropriate storage tanks, barrels, cupboards, rooms and building.
7. Consider installing spill detecting and alarming system if necessary.
8. Limit storage and restrain personnel from entering this district. Post the warning mark in an appropriate place.
9. Separate storage and employee-centered operation areas.
10. Do the flaw inspection of spill and damage etc. regularly.
11. Prepare emergent extinguishing apparatus in storage areas and nearby.

12. Follow relevant regulations of storage and handling flammables or combustibles.

Section 8. Exposure controls

Engineering controls:

1. Operation sometimes needs local exhaust systems.
2. Use explosion-resistant and earth-connection ventilation system separately.
3. Direct outside exhaust vents.
4. Handle exhausting gas to avoid polluting the environment.
5. Supply adequate fresh air to replenish the exhausted air.

Control parameters			
TWA	STEL	CEILING	BEIs
1 ppm (tumor)	2 ppm (tumor)	-	-

Personal protective equipment:

• Respiratory protection:

1. Any detectable levels: portable positive-pressure full-type, positive-pressure air-feed full-type supply with portable positive-pressure respiratory protective equipment.
2. Escape: Mask with formaldehyde-proof cartridges, portable escape-type respiratory protective equipment.

• Hand protection: Leak-proof glove materials of Butyl rubber, rubber-like, Viton, Saranex, Barricade, Chemrel are better.

• Eye protection:

1. Chemical leak-proof goggles or masks.
2. Don't wear contact lens while operating.

• Skin and physical protection: Above rubbery material aprons, safe shower sets, work boots.

Hygiene measures:

1. Remove contaminated clothing quickly as possible after work. Clean clothing before reuse or abandon. Tell cleaning staffs the harmfulness.
2. Forbid smoking or eating in workplace.
3. After handling this material, wash hands thoroughly.
4. Keep workplace clean.

Section 9. Physical and Chemical Properties

Appearance: Colorless, clear liquid.	Odor: Peppery and acrid smell
Odor threshold: 0.027 ~ 1.9 ppm (censor)	Melting point: -92°C
pH: 2.8 ~ 4	Boiling point/Boiling range: -19.5°C
Flammability (solid, gas): -	Flash point: 82°C

Decomposition temperature: -	Test method: Close cup
Auto-ignition temperature: -	Explosion limits: 7% ~ 73%
Vapor pressure: 18 mmHg (20°C)	Vapor density: 1.03 (air=1)
Density: 1.102 (20°C)	Solubility: 55 g/100 mL (water)
Partition coefficient (n-octanol/water, log K_{ow}): -	Volatility rate: -

Section 10. Stability and Reactivity

Chemical stability: Stable under ordinary conditions.

Possibility of hazardous reactions:

1. The solution state is steady. It will oxidize and convert to formic acid slowly in the air.
2. Strong oxidants: Vigorous or explosiveness reaction.
3. Strong alkalis: The reaction may release carbon dioxide to break containers.
4. Phenol: While producing phenol-formaldehyde resin, it may cause runaway reaction.
5. The pure formaldehyde will polymerize to a trimer.

Conditions to avoid: -

Materials to avoid: Strong oxidants, strong alkalis, phenol, urea.

Hazardous decomposition products: -

Section 11. Toxicological Information

Exposure Route: Skin, inhalation, ingestion, eye.

Symptoms: Irritation, inflammation, dermatitis, allergy, lacrimation, burning.

Acute toxicity:

• Inhalation:

1. Vapors irritate nose, pharynx and trachea seriously.
2. Below 2 ~ 3 ppm, it irritates nose and pharyngeal back but inducible. Under 4 ~ 5 ppm, it is inducible for 10 ~ 30 minutes but discomfort sense is heightened over 30 minutes.
3. Hard breathing, serious ardor of nose, pharynx and trachea, cough will occur on 10 ~ 20 ppm. 50 ~ 100 ppm may cause serious injury.
4. High concentration causes lung edema (symptoms will appear several hours later), pneumonia or death.

• Skin:

1. Solution will cause irritation, smart, dry, and red skin.

• Eyes: 0.2 ppm will irritate. 2 ~ 3 ppm will be twinging. 4 ~ 5 ppm will shed tears. 10 ppm will shed tears incessantly. High-concentrated solution may cause severe irritation and damage.

• Ingestion: 1. May cause irritation of mouth, pharynx, esophagus, intestine and pain. The following symptoms include dizziness, depression and shock. 2. May develop jaundice, body temperature reducing, acidosis and blood urine. 3. Because its vapor turns into the trachea from esophagus, inhalation symptoms will present then. 4. Methanol of different-class formaldehyde solution may also cause toxic effects. • LD_{50} (animal test, entry): 100 mg/kg (rat, swallow), 270 mg/kg (rabbit, skin). • LC_{50} (animal test, entry): 480 ppm (rat, inhalation). • 2 mg/24 hours (rabbit, skin): Cause severe irritation. • 750 μg/24 hour(s) (rabbit, eye): Cause severe irritation.
Chronic / Long-term toxicity: 1. Carcinogenesis: IARC classifies it as suspected carcinogen. 2. Soviet study has reported women have been exposed to formaldehyde and other chemical causing irregular menstrual cycle and second infertility. 3. Bacterium, human cell-lines or animal's gene mutation testing show positive findings. 4. Formaldehyde is a byproduct of normal human metabolism. It will decompose rapidly in the body and covert to carbon dioxide and water. 5. 168 mg/kg (pregnant rats of 1 ~ 21 days, ingestion) cause abnormal embryo development.

Section 12. Ecological Information

Ecological toxicity: 1. LC_{50} (fish): 96 ~ 7,200 mg/L/96 hours 2. EC_{50} (aquatic invertebrates): 2 mg/L/48 hours (water fleas) 3. Bioconcentration factor (BCF): -
Persistence and degradability: 1. This material is usually biodegraded by microorganism and bacteria in the soil. 2. When released into the water, this material will biodegrade and decrease the concentration within several days. 3. When released into the air, this material is expected to have a photochemical reaction and react with hydroxyl free radicals. • Half-life (Air): 1.25 ~ 6 hours • Half-life (Water surface): 24 ~ 168 hours • Half-life (Groundwater): 48 ~ 336 hours • Half-life (Soil): 24 ~ 168 hours
Bioaccumulative potential: After decomposing to formic acid soon in the body, it converts to carbon dioxide and water.

Mobility in soil: When released into the soil, this material biodegrades under aerobic or anaerobic condition.
Other adverse effects: -

Section 13. Disposal Considerations

Waste disposal: 1. Consult references to regulations. 2. Adopt particular incineration or sanitary burying.

Section 14. Transport Information

United Nations Number (UN No.): 2209
UN Proper Shipping Name: Formaldehyde solution
Transport Hazard classes: 8
Packaging Group: III
Marine pollutant (Yes/No): No
Specific Transport Measures and Precautionary Conditions: -

Section 15. Regulatory Information

Applicable Regulations: 1. Occupational Safety and Health Act. 2. Regulations for the Labeling and Hazard Communication of Hazardous Chemicals. 3. Toxic Chemical Substances Labeling and Materials Safety Data Sheets Regulations. 4. Toxic and Concerned Chemical Substances Control Act. 5. Public Hazardous Substances & Flammable Pressurized Gases Establishment Standards & Safety Control Regulations. 6. Standards of Permissible Exposure Limits at Job Site. 7. Regulations Governing Designating and Handling of Priority Management Chemicals.

Section 16. Other Information

References	1. CHEMINFO database, CCINFO CD-RAW, 2005-2 2. HAZARDTEXT database, TOMES PLUS CD-RAW, 2005 3. RTECS database, TOMES PLUS CD-RAW, Vol.63, 2005 4. HSDB database, TOMES PLUS CD-RAW, Vol.63, 2005 5. Hazardous Chemical Substances Chinese database, EPA 6. ChemWatch database, 2013 7. OHS MSDS database, 2013 8. National Institute of Technology and Evaluation 9. European Chemicals Agency (ECHA)

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Notes	The symbol " - " in this sheet indicates no available information; the symbol " / " indicates the information is not applicable to the substance.