大東樹脂化學股份有限公司
GREAT EASTERN RESINS INDUSTRIAL CO.,LTD.

Safety Data Sheet

No. 98N

1. CHEMICAL AND COMPANY INFORMATION

Chemical name：PU Adhesive

Other names：—

Product code：98N

Recommendation and Restriction on Use：Adhesive

Name , addresses , and phone numbers of the manufacturer importer or supplier：

GREAT EASTERN RESINS INDUSTRIAL CO., LTD
35, 34 Road, Taichung Industrial Park, Taichung, Taiwan, R. O. C.
TEL: 886-4-2358-7676

Emergency contact phone numbers/fax numbers：TEL: 886-4-2358-7676 FAX: 886-4-2358-1291

2. HAZARDS IDENTIFICATION

Chemical hazards classification：

Flammable Liquid - Category 2
Skin Corrosion / Irritation - Category 3
Serious Eye Damage / Eye Irritation - Category 2A
Specific Target Organ Systemic Toxicity - Repeated Exposure - Category 2
Aspiration Hazard - Category 2

Label content：

Symbol：Flame 、Health hazard 、Exclamation mark

Signal word：danger

Hazard statements：

Highly flammable liquid and vapor.
Cause mild skin irritation.
Cause serious eye irritation.
Long-term or repeated exposure may cause damage to organs
Be harmful if swallowed and enter the respiratory tract

Precautionary statements：

Close container tightly
It's far away from the ignition and should be in No Smoking Area.
Store in a cool and well ventilated place.
Wear suitable gloves
Once clothes are contaminated , remove immediately
Wear eye/face protection.
Avoid contact with eyes or skin. If eye contacts, flush immediately with water and get medical aid.
Do not eat or drink when using this product.
Do not induce vomiting.
Avoid releasing to the environment.
Wash hands thoroughly after using this product.
Before using product, read material safety data sheet.

Other hazards：—

3. INGREDIENTS IDENTIFICATION INFORMATION

MIXTURE：

Chemical property：

Names of the hazardous ingredients	Concentration or concentration ranges (% of contents)	CAS No.
Methyl Ethyl Ketone (MEK)	41 – 56	78-93-3
Ethyl Acetate (EAC)	6 – 21	141-78-6
Acetone(ACT)	16 – 31	67-64-1

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Polyurethane Resin	13.5 – 16.5	9009-54-5

4. FIRST-AID MEASURES:

The first-aid measures for different exposure routes :

- **Inhalation :**

1. Remove exposed person from source of exposure to fresh air.
2. If not breathing, clear airway and start cardiopulmonary resuscitation (CPR). If breathing is difficult, give oxygen.
3. Get immediate medical attention.

- **Skin contact :**

1. Immediately flush the skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
2. Wash contaminated clothing/shoes before reuse.
3. Get immediate medical attention.

- **Eye contact :**

1. Check and remove contact lens, and flush immediately with large amounts of water for at least 15 minutes.
2. Get immediate medical attention.

- **Ingestion :**

1. Do not induce vomiting.
2. Drink 240-300C.C. water.
3. Get medical attention immediately.

The most important symptoms and hazardous effects :

Vapor may depress central nervous system. It may cause insensibility at high concentration.

The protection of first-aiders :

Wear protective gloves to prevent from contacting with pollutant.

Notes to physicians :

Consider using gastric lavage if swallowed.

5. FIRE-FIGHTING MEASURES :

Suitable fire extinguishing media：Dry chemical powder, alcohol foam, and carbon dioxide.

Special hazards may be encountered during fire-fighting :

1. Liquid and vapor are flammable. Vapors are heavier than air and may spread to distant ignition sources and flash back.
2. It will be degradable and produced toxic gas at high temperature.
3. Vapors can explode when mixed with air.
4. Extremely flammable at room temperature.
5. High concentration in water may be flammable.
6. Containers may explode in heat of fire.

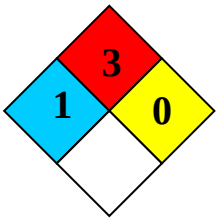
Special fire-fighting methods:

1. Keep people away.
2. Stay upwind to avoid hazardous vapor and toxic resolvent.
3. Isolate fire zone and deny unnecessary entry.
4. Fire may expand. Do not use water column to extinguish fire directly.
5. Use water spray to fight fire may be ineffective, except training.
6. Use water spray to cool down temperature until is out of danger and re-ignition has passed.
7. Move container from fire area if it's possible without hazard.
8. Protections and a respirator are necessary while extinguishing fire.
9. Leave all people out of fire area by safety equipment and flash signal.
10. Only allow personnel wearing special protective equipment to enter
11. Water column will allow the spillage spread while extinguishing fire, attention to people safety and minimizing the danger level.
12. Use water spray to isolate fire area.

Special equipment for the protection of firefighters :

NFPA Hazard Rating

. Health Hazard (Blue)：1
. Fire Hazard (Red)：3
. Reactivity (Yellow)：0
. Special Hazard (White)：



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Must wear positive pressure self-contained breathing apparatus and full protective clothing.	

6. ACCIDENTAL RELEASE MEASURES

Personal precautions :

1. Restrict personnel from entering the polluted area until completely cleaned.
2. Make sure that only trained personnel are allowed to clean up.
3. Wear appropriate personal protection equipment.

Environmental precautions :

1. Working area is well ventilated.
2. Remove all fire sources and keep away from heat.
3. Inform the safety, healthy and environment protection relational agencies of the government.
4. Avoid leakage getting into sewer or sealed areas.

Methods for cleaning up :

1. Stop leak if without risk. Dike spill if need. Take up with dry sand, earth or other appropriate absorbent material.
2. Place in a chemical waste container and call for assistance on disposal.

7. SAFE HANDLING AND STORAGE MEASURES

Handling :

1. Keep out of children's reach.
2. Do not breathe vapors.
3. Use only with adequate ventilation.
4. Do not get in eyes, on skin or on clothing.
5. Wash thoroughly after using.

Storage :

1. Storage in cool, dry and well ventilated area.
2. Keep away from caustics, oxidizers incompatibles, heat, spark and flame.
3. No smoking at storage and using area.

8. EXPOSURE CONTROLS MEASURES

Engineering control：When agitation, manufacture or packing must pay attention has the pump assembly to ventilate. Keep away from heat, sparks and open flame. The equipment which washes the hands and eyes should be established approach to the work place.

Control parameters			
8 hours time weighted average exposure limits	**Short-term exposure limits**	**Maximum exposure limits**	**Biological standards**
MEK 200 ppm EAC 400 ppm ACT 750 ppm	MEK 250 ppm EAC 500 ppm ACT 937.5 ppm	— — —	MEK in urine is 2mg/L(Ns) after work. (MEK) ACT in urine is 50mg/L(Ns)

Personal protective equipment :

- **Respiratory protection :** Use only in a well ventilated area and wear anti-poison respirator.
- **Hand protection :** Put on the protection type glove.
- **Eye protection :** Wear chemical safety goggles.
- **Skin and body protection :** Wear solvent impervious gloves, apron, boots, pants and jacket.

Hygiene measures :

1. Take off contaminated clothing as soon as possible after work and clean before re-use. Must let the cleaners know the dangerous of the pollutants.
2. No smoking and eating in working place.
3. Wash hands thoroughly after use.
4. Keep the place clean.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearances(state、color, etc.)：Gel like liquid	**Odor**：Pungent Odor

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Odor threshold： 6.4-50ppm(detection) (EAC) 13.3-75ppm (recognition) (EAC) 2-85ppm(detection) (MEK) 5.4-55ppm (recognition)(MEK) 3.6-653ppm(detection) (ACT) 33-699ppm (recognition)(ACT)	**Melting point：** -94.6 ~ -83 ℃
pH value： —	**Boiling point/boiling range：** 56.2 ℃
Flammability (solid、liquid)： —	**Flashpoint :** <23 ℃
Decomposition temperature： —	**Test method (**Open cup or Close cup **):** Close cup
Autoignition temperature： 404 ℃	**Explosion limits：** 1.8 % ～12.8 % (Reference range)
Vapor pressure： 73~180 mmHg	**Vapor density：** 2-3.04(Air =1)
Density： ＜1 (H_2O=1)	**Solubility：** Slightly Soluble In Water 8.6mg/100ml(EAC) 26.8-29mg/100ml(MEK) Soluble In Water(ACT)
Octanol／Water partition coefficient： MEK: 0.29 EAC: 0.66-0.73 ACT: -0.24	**Evaporating rate：** MEK:5.7(BuAc =1) EAC:6.2(BuAc=1) ACT:5.6(BuAc=1)

10. STABILITY AND REACTIVITY

Stability : It's stable to use and store under normal condition.
Hazardous reactions may occur under specific conditions: Strong oxidizers (peroxide, nitrate, perchloric acid): the danger of fire and explosion may increase.
Conditions to avoid: Heat, flames, static electricity, spark and ignition source.
Materials to avoid: Incompatible with strong oxidizers, strong acids and strong bases.
Hazardous decomposition products: Heat may decompose the product to carbon monoxide and carbon dioxide.

11. TOXICOLOGICAL INFORMATION

Exposure routes： inhalation, skin contact, eye contact, ingestion.

Symptoms： headache, tired, nausea, vomit, stupor, dermatitis

Acute toxicity :

- **Inhalation:** Inhalation of vapors can irritate the upper respiratory tract which may cause coughing, dizziness, nausea and headache. High concentrations can produce central nervous system depression, narcosis and unconsciousness.
- **Skin contact:** Defatting leads to skin irritating, redness, pain and cracking of the skin.
- **Eye contact:** Vapors may irritate eyes and causes redness, pain and tearing.
- **Ingestion:** To depress central nervous system and the effects can be similar to inhalation.

LD50(Animal testing, Absorption route)： 2740mg/kg (Rat, Oral)(MEK), 5600 mg/kg (Rat, Oral)(EAC), 5800mg/kg(Rat, Oral)(ACT).
LC50(Animal testing, Absorption route)： 11300ppm/4H (Rat, Inhalation)(MEK), 16000ppm/6H (Rat, Inhalation)(EAC), 50100ppm/6H(Rat, Inhalation)(ACT).

Chronic toxicity or long term toxicity：

MEK: 1. Impact on the nervous, liver and skin. 2. 3000ppm/7H (6-15 days pregnant mouse, Inhalation) cause embryo dysplasia.
EAC: 1. It will only cause slight eye irritation in long term exposure on EAC concentration about 4200~13900ppm. 2. 10% EAC solution won't cause skin allergies for average person, but will cause skin allergies for sensitive person. 3. EAC will cause long-term damage in mammalian cells.
ACT: 1. Long-term or frequently contact may cause skin defatting and dermatitis. (dry, irritation, redness and cracked). 2. Exposure to 3 hours a day for 7-15 years, it will feel the nose and throat irritation, disorientation and

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weakness in 1000ppm concentration. 3. Exposure to ACT, it will increase hepatotoxicity of chlorinated solvent, such as 1,1-dichloroethylene, 1,1,2-trichloroethane, Trichloromethane, Trichloroethylene. 4. 31500ug/m3/24H (Mammal, Inhalation) impact on its fertility.

12. ECOLOGICAL INFORMATION

Ecotoxicity：

MEK: 1. LC50 (fish): 1690-5640mg/l/96H. 2. Bioconcentration factor (BCF): 1

ACT: 1. LC50 (fish): 8300-40000mg/l/96H. 2. EC50 (aquatic invertebrates): 10mg/l/48H (daphnia). 3. Bioconcentration factor (BCF): 0.69

Persistence and degradation：

MEK: 1. Most MEK will be transformed into acetate after metabolizing, decomposed to carbon dioxide and water, and eliminated by breathing or in urine. Some of MEK can only be eliminated by breathing or in urine. MEK and its metabolite will be eliminated completely from body in 24h. 2. MEK will be decomposed by using activated sludge or in aerobic environment. 3. MEK will evaporate to the air when releasing into water and its half-life is around 3-12 days. 4. MEK will interact with hydroxyl free radical, and its half-life is 2.3 days.

EAC: 1. EAC is very easy to be decomposed by biological. 2. When release into water, it is mainly by evaporating.

ACT: 1.Although ACT under both aerobic and anaerobic conditions is to be biodegradable rapidly, it is toxic to microorganisms in high concentration. 2. Release into the atmosphere, ACT will react with hydroxyl radicals. (Its half-life is about 22 days.) 3. Release into water, it is expected to be biodegradable.

- **half-life(air)**：64.2~642hr(s) (MEK), 35.3~353hr(s) (EAC), 279~2790hr(s) (ACT)
- **half-life(surface water)**：24~168hr(s) (MEK), 24~168hr(s) (EAC), 24~168hr(s) (ACT)
- **half-life(ground water)**：48~336hr(s) (MEK), 48~336hr(s) (EAC), 48~336hr(s) (ACT)
- **half-life(soil)**：24~168hr(s) (MEK), 24~168hr(s) (EAC), 24~168hr(s) (ACT)

Bioaccumulation:

It will not accumulate. When EAC gets into body, it will be decomposed to ethanol and acetic acid, and EAC which has not be decomposed, will be eliminated by urine when exposure in 2h. (EAC).

It will not accumulate. Most of ACT can be excreted by breathing, others will be oxidized into carbon dioxide and then excreted by breathing and the urine. (ACT).

Movement through soil：

Emission to soil, some of MEK will evaporate, some will permeate into ground. (MEK).

EAC will evaporate or dissolve in groundwater when it emissions on the ground. (EAC).

When ACT released into the soil, it is expected to be biodegradable and evaporated from the soil surface. (ACT).

Other negative effects： —

13. WASTE DISPOSAL MEASURES

Methods of waste disposal： Discarded material should be incinerated at a permitted facility.

14. TRANSPORT INFORMATION

United Nation number (UN No)： 1133

UN Name： Adhesive

DOT hazard classification： 3 FLAMMABLE LIQUID

Packing Group： II

Ocean contaminants（Yes／No）： No

Specific transport measures and precautionary conditions： —

15. REGULATORY INFORMATION

Applicable regulations :

1. Occupational Safety and Health Act.
2. Regulations for the Labeling and Hazard Communication of Hazardous Chemicals.
3. Road Traffic and Safety Regulation.
4. Methods and Facilities Standards for the Storage, Clearance and Disposal of Industrial Waste.

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5. Public Hazardous Substances & Flammable Pressurized Gases Establishment Standards & Safety Control Regulations.
6. Standards of Permissible Exposure Limits of Airborne Hazardous Substances in Workplace.

16. OTHER INFORMATION

Reference	1. CHEMINFO DATABASE 2. HAZARDTEXT DATABASE (TOMES PLUS) 3. RTECS DATABASE (TOMES PLUS) 4. HSDB DATABASE (TOMES PLUS) 5. Hazardous materials database (Ministry of Labor, TAIWAN) 6. UNECE GHS (GLOBAL HARMONIZED SYSTEM)
Company	**Name :** GREAT EASTERN RESINS INDUSTRIAL CO., LTD **Address / Telephone:** 35, 34 Road, Taichung Industrial Park, Taichung / 886-4-2358-7676
Prepared by	**Department** : R&D Center **Title** : Researcher **Name(Signature)** : Chiang Liang-Wei
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