



Industrial Summit Technology Corporation
Safety Data Sheet

Date Updated / June 01, 2015
Product Name / SKYBOND® 700 Polyimide Resin

Section 1

Identification

Chemical Product Name/Identifier

SKYBOND® 700 Polyimide Resin

CAS Number

Mixture

Trade Names and Synonyms

Solution of aromatic polyimide precursor in ethanol and n-methyl pyrrolidone (NMP)

Recommended Use and Restrictions on Use

Polyimide Resin

Company Information

Industrial Summit Technology Corporation
250 Cheesequake Road
Parlin, NJ 08859

Telephone

Product and Sales Information: 732-238-2211

Emergency Phone

CHEMTREC: 1-800-424-9300

Section 2

Hazards Identification

OSHA HCS Status

This product is a hazardous chemical, as defined by OSHA at 29 CFR 1910.1200. Hazards identified are based on hazards of the ingredients.

Relevant Route of Exposure/Target Organs

Dermal, Eyes, Inhalation, Respiratory System

OSHA/GHS Signal Word and Hazard Statements

DANGER: Flammable liquid and vapor. Causes skin irritation. Causes eye irritation. Toxic in contact with skin. May cause an allergic skin reaction. Suspected of causing genetic defects. May damage fertility of the unborn child. Causes damage to organs (respiratory system). May damage organs (liver, kidney, blood) through prolonged or repeated exposure. Harmful if inhaled. Toxic if swallowed. May be fatal if swallowed and enters airways. May cause cancer. Harmful to aquatic life with long lasting effects.

OSHA/GHS Classification and Pictograms

Flammable liquid (Category 3) H226

Acute toxicity, inhalation (Category 3) H331
Acute toxicity, oral (Category 3) H302
Acute toxicity, dermal (Category 3), H311
Skin irritation (Category 2) H315
Eye irritation (Category 2A) H319
Skin sensitization (Category 1) H317
Germ cell mutagenicity (Category 2) H341
Aspiration hazard (Category 1), H304
Carcinogenicity (Category 2) H351
Reproductive toxicity (Category 1B) H360
Specific target organ toxicity - single exposure (Category 3, respiratory system) H335
Specific target organ toxicity - repeated exposure (Category 2, liver) H373
Acute aquatic toxicity (Category 2) H401
Chronic aquatic toxicity (Category 2) H411

For the full text of the H-Statements mentioned in this Section, see Section 16



OSHA/GHS Precautionary Statements

Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces.– No smoking. Keep container tightly closed. Ground/Bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge.

Wear protective gloves/eye protection/face protection specified in Section 8.

Wash hands and exposed skin thoroughly after handling. Wear protective gloves, eye and face protection. Avoid breathing mist, vapors, and spray. Use only outdoors or in well-ventilated area. Obtain special instructions before use.

Contaminated work clothing must not be allowed out of the workplace.

Response

In case of fire: Use water spray, foam, dry chemical, carbon dioxide, or any Class B extinguishing agent.

If exposed or concerned: get medical advice/attention.

If on skin (or hair): Take off immediately all contaminated clothing and wash it before reuse. Wash skin with plenty of water/shower. Specific treatment: see Section 4 for First Aid instructions. If skin irritation or rash occurs: Get medical advice/attention. Call a poison center/doctor if you feel unwell.

If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

If swallowed: Immediately call a poison center/doctor. Do NOT induce vomiting. Rinse mouth.

If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell.

Storage

Store in a well-ventilated place. Keep Cool. Keep container tightly closed. Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

GHS Hazard and Precautionary Statement Codes

See Section 16.

Section 3

Composition/Information on Ingredients

Chemical Product Name

SKYBOND® 700 Polyimide Resin

Component	CAS #	Weight %
N-methyl-2-pyrrolidone	872-50-4	34
1,2-Benzenedicarboxylic acid, 4,4'-carbonylbis-ar, ar'-diethyl ester, compd with 1,3-benzenediamine	65701-07-7	60.48
Methyl isobutyl ketone	108-10-1	≈0.1
Ethanol	64-17-5	4
1,3 -Diaminobenzene (m-phenylenediamine)	108-45-2	13
Methanol	67-56-1	<0.2

Section 4

First-Aid Measures

Skin Contact

Immediately wash skin with soap and water. Remove contaminated clothing. Get medical attention. Wash contaminated clothing before reuse.

Eye Contact

Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Inhalation

Remove person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, get medical attention. Remove material from eyes, skin, and clothing.

Ingestion

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

Most Important Symptoms/Effects

Skin and eye irritation. May cause respiratory irritation or distress. May cause cancer and damage fertility or the unborn child. Repeated or prolonged contact may cause allergic skin reaction in some people. May cause liver damage.

Indication of Immediate Medical Attention and Special Treatment Needed

Get medical attention immediately if product comes into contact with skin or eyes, or if it is inhaled or ingested.

Section 5

Fire-Fighting Measures

Extinguishing Media

water spray, foam, dry chemical, carbon dioxide, or any Class B extinguishing agent.

Hazardous Combustion Products

Oxides of carbon produced when burned.

Protective Equipment

Firefighters and others who may be exposed to products of combustion (see Hazardous Decomposition Products in Section 10) should be equipped with self-contained breathing apparatus and full protective gear. Equipment should be thoroughly decontaminated after use.

Fire Fighting Procedures/Precautions

Keep away from heat/sparks/open flames/hot surfaces. Keep personnel removed and upwind of fire. Closed containers exposed to heat may build up pressure. Use water spray to keep exposed containers and equipment cool. Use water spray to cool containers and tanks.

Section 6

Accidental Release Measures

Personal Precautions

Review Firefighting Measures and Handling sections before proceeding with clean up. Take precautions to avoid eye, skin, and respiratory exposure. Should exposure occur, see Section 4 for first aid measures. Flammable vapors can accumulate in low areas and form explosive concentrations.

Protective Equipment

Use appropriate personal protective equipment during clean up. See Section 8.

Emergency Procedures

Maintain adequate ventilation. Shut off all sources of ignition. No heat, sparks, or flame in the area.

Methods/Materials for Containment and Cleaning Up

Dike spill. Remove sources of sparks, flame, or hot surfaces. Absorb spill with commercial absorbent material and place in suitable containers for disposal. Dispose of as hazardous waste (see section 13). Do not discharge into waterways or sewer systems without proper authority. Dispose of in accordance with government regulations.

Section 7 Handling and Storage

Precautions

Avoid breathing vapors or mist. Avoid contact with eyes, skin, or clothing. Wash thoroughly after handling. Do not store or consume food, drink or tobacco in areas where they may become contaminated with this material. Keep away from heat, sparks and flames.

Storage

Keep container in a cool place. Store below 50 C (122 F). Keep container tightly closed. Store in accordance with National Fire Protection Association recommendations.

Section 8 Exposure Controls/Personal Protection

Exposure Limits

Component	OSHA PEL	ACGIH TLV	OARS/WEEL**	I.S.T/AEL*
N-methyl-2-pyrrolidone	NA	NA	10 ppm 8 hr TWA	25 ppm 8 hr TWA
Methyl isobutyl ketone	50 ppm 205 mg/m3 75 ppm STEL	20 ppm	NA	NA
1,2-Benzenedicarboxylic acid, 4,4'-carbonylbis-ar, ar'-diethyl ester, compd with with 1,3-benzenediamine	NA	NA	NA	NA
Ethanol	1000 ppm 1900 mg/m3	1000 ppm	NA	NA

1,3 -Diaminobenzene (m-phenylenediamine)	NA	0.1 mg/m3	NA	NA
Methanol	200 ppm 260 mg/m3	200 ppm 250 STEL	NA	NA

* AEL is I.S.T's acceptable limit. Where governmentally imposed occupational exposure limits, which are lower than the AEL are in effect, such shall take precedence.

** Occupational Alliance for Risk Science, workplace environmental exposure level.

Engineering Controls

Use ventilation that is adequate to keep employee exposure to airborne concentrations below recommended exposure limits. Provide natural or mechanical ventilation to control exposure levels below airborne exposure Limits (see section 6 above). If practical use, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult NFPA Standard 91 for design of exhaust system.

Personal Protection Measures/Equipment

Skin Protection

Wear appropriate chemical resistant gloves and clothing to prevent skin contact. Consult glove manufacturer to determine appropriate type of glove for given application. Wear chemical safety goggles, a face shield and a chemical resistant apron when splashing is likely. Wash immediately if skin is contaminated. Remove contaminated clothing promptly and launder before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash hands and exposed skin thoroughly after handling. Repeated or prolonged contact may cause allergic skin reaction in some people.

Eye Protection

Wear eye and face protection. Wear chemical goggles that meet ANSI Z87 standards and/or are tested and approved under appropriate government standards. Eyewash stations should be easily accessible.

Respiratory Protection

Avoid breathing vapor and/or mist. Use NIOSH/MSHA approved respiratory protection equipment (full face piece recommended) when airborne exposure limits (see below) are exceeded. If used, full face piece replaces need for face shield and chemical goggles. Consult respirator manufacturer to determine the appropriate type of equipment for given application. Observe respirator use limitations specified by NIOSH/MSHA or the manufacturer. Respiratory protection programs must comply with 29 CFR 1910.134.

Section 9

Physical and Chemical Properties

Appearance (physical state, color, etc.)

Brown viscous liquid

Odor

Amine-like

Odor Threshold

Not known

pH

Not known

Melting Point/Freezing Point

Not known

Initial Boiling Point

Not known

Flash Point

120°F

Evaporation Rate

Not known

Flammability

Flammable liquid

Upper/Lower Flammability or Explosive Limits

Not known

Vapor Pressure

24 mm Hg

Vapor Density

3.23

Relative Density/Specific Gravity

1.15 – 1.18

Solubility

Slight in water

Partition Coefficient

Not known

Auto-ignition Temperature

Not known

Decomposition Temperature

Not known

Viscosity

2,500-7,000 cps at 25°C

% Volatiles

Not known

Solids after Cure

46%

Note

This physical data are typical values based on material tested by may vary from sample to sample. Typical values should not be considered as a guaranteed analysis of any specific lot or as a specification for the product.

Section 10

Stability and Reactivity

Reactivity

Not known

Chemical Stability

Not known

Hazardous Reactions

Not known

Conditions to Avoid

All sources of ignition – heat, sparks, and open flames. Volatiles given off during cure - Ethanol. N-methylpyrrolidone.

Incompatible Materials

Strong oxidizing agents, strong alkali

Hazardous Decomposition Products

Carbon monoxide, nitrogenous products

Hazardous Polymerization

Does not occur

Section 11

Toxicological Information

Relevant Route of Exposure/Target Organs

Dermal, Eyes, Inhalation, Respiratory System

Symptoms

Causes skin irritation. Causes serious eye irritation. Toxic if inhaled. May cause respiratory tract irritation. May damage fertility or the unborn child.

Delayed and Immediate Effects

Eye effects

N-methyl-2-pyrrolidone

Eye contact with the liquid or vapor may initially result in irritation with discomfort, tearing, or blurring of vision. Low vapor concentrations caused eye irritation in some individuals.

Skin effects

Skin contact may initially result in irritation with discomfort or rash.

N-methyl-2-pyrrolidone

Human experience has demonstrated severe dermatitis (blistering, cracking, edema, redness) upon prolonged or repeated skin contact. There are inconclusive or unverified reports of human sensitization.

Respiratory effects

Inhalation may result in irritation of the upper respiratory passages, with coughing, discomfort and headache.

Health Effects Summary

Chronic Effects (Following Short and Long Term Exposure)

The following information summarizes experience and results of scientific investigations reviewed by health professionals for hazard evaluation of SKYBOND® 700 polyimide resin and development of Precautionary Measures and Occupational Control Procedures recommended in this document. Industrial Summit Technology Corp has not conducted studies on SKYBOND® 700 polyimide resin and no data was obtained in a search of the available scientific literature. However, toxicity information is available on representative polyimide resins.

Inhalation and skin contact are expected to be the primary routes of occupational exposure of SKYBOND® 700 Polyimide Resin.

Occupational exposure to this material has not been reported to cause significant adverse human health effects. However, SKYBOND® 700 polyimide resin is considered to cause severe eye irritation based on animal studies. The organic solvents described below, have been reported to cause eye, skin and respiratory tract irritation and may contribute to the health effects of this material. These solvents also possess narcotic-like properties; excessive exposure may result in headache, dizziness, in coordination, nausea, loss of appetite and loss of consciousness.

Toxicological Data

Single exposure (acute) animal studies conducted on representative polyimide resins indicate that these materials are slightly toxic or practically nontoxic orally (rats) and practically nontoxic after skin application (rabbits). They range from practically nonirritating to moderately irritating to rabbit skin and moderately irritating to corrosive to rabbit eyes.

Data from Industrial Summit Technology Corporation, studies, and from the available scientific literature on the components of SKYBOND® 700 polyimide resin which have been identified under the criteria of the OSHA Hazard Communication standard (29 CFR 1910.1200) are discussed below.

Meta-phenylenediamine (m-PDA)

Meta-phenylenediamine (m-PDA) is used in the production of this polyimide resin. Single-dose (acute) animal studies indicate that m-PDA is moderately toxic orally (rats) and inhalation (rats) and slightly toxic after skin application (rabbits). It is moderately irritating to rabbit eyes and skin. Allergic skin reactions have been reported in various laboratory animals repeated skin application tests. Rats given this material orally for 90 days showed increased liver and kidney weights and liver damage.

No significant increase in tumors were reported in a drinking water study (mice, 78 weeks), skin painting study (mice 24 months), or long term feeding study (rats, mice). No birth defects were reported in rats given this material orally during pregnancy, even at levels which produced toxic effects to the mother.

Adverse genetic effects have been reported in standard tests using bacterial and animal cells. Both positive and negative genetic changes were reported in standard tests using animals. No adverse genetic changes were reported in standard tests with human cell cultures and insects.

n-Methyl Pyrrolidone (NMP)

Human experience indicates that continued or gross skin contact with NMP produces irritation, redness, and defatting of the skin. Inhalation of very high concentrations of NMP may result in headache, giddiness, nausea, and mental confusion. Repeated dosing of laboratory animals with NMP has been reported to cause changes in organ weights and blood composition, reduced response to sound, and breathing difficulty at a dosage which produced death. No skin allergy was observed in guinea pigs following repeat skin exposure. Long-term inhalation (2 years) of NMP produced no increase in tumors in rats and NMP did not show Tumor initiating activity in a mouse skin painting study. Birth defects were reported following dermal application of MP to rats at amounts which produced adverse effects on the mother and following intraperitoneal injection in two strains of mice. No birth effects were reported in rats exposed to NMP by inhalation. No effects were seen on the ability of rats to reproduce when exposed to NMP for two successive generations, although toxic effects were reported in offspring at levels which produced adverse effects on the mother. NMP has produced no genetic changes in standard tests using animal and bacterial cells.

Ethanol

Swallowing of ethanol also causes central nervous system effects and digestive tract effects; large amounts may cause respiratory failure leading to death. Other effects of ethanol related to repeated intake of alcoholic beverages including nutritional deficiencies, liver, and pancreas damage and secondary blood cell changes. Repeated consumption of ethanol (alcoholic beverages) by pregnant women is reported to produce adverse effects on the development of their offspring ("fetal alcohol syndrome").

Single-dose (acute) animal studies indicate that ethanol is practically non-toxic orally (rats), after skin application (rabbits) and after inhalation (rats). It is mildly to severely irritating to rabbit eyes and practically nonirritating to moderately irritating to rabbit skin. It is practically non-toxic by inhalation (Rat LD50-20,000 ppm, 10-hr. exposure). Various morphological functions and biochemical changes including changes in the heart muscle, liver, CNS, and blood cells have been reported for experimental animals given ethanol orally. Repeated inhalation exposures produced liver damage in rabbits, while other treatment-related effects were reported in pigs, dogs, and monkeys. Rats exposed by skin application to a 50o/o solution of ethanol showed only temporary skin irritation. Several species of laboratory animals have been exposed to

ethanol by various routes to determine effects on an offspring. While susceptibility varies with each species, birth defects have been consistently reported in many of the species tested (mouse, rat, pig, guinea pig, monkey). Ethanol produced genetic changes in standard tests using human volunteers and animals and yeast cells. No genetic changes were reported in standard tests using bacterial or animal cells, negative responses were reported in assays using human cells.

Ethanol in alcoholic beverages is listed as a substance which is "carcinogenic to humans" by the International Agency for Research on Cancer (IARC Monographs Vol. 44). This IARC listing is based on evidence of carcinogenicity of alcoholic beverages following long-term consumption of alcoholic beverages. Epidemiological studies report increased incidence of mouth and throat cancer in humans after long-term consumption of alcoholic beverages. Higher risk is associated with the drinking of dark liquors and for smokers who consume alcoholic beverages.

Methanol

In addition to the effects noted, significant swallowing of methanol also causes central nervous system effects and possible damage to the kidneys. Temporary or permanent visual disturbances are commonly seen with methanol poisoning in man, although permanent loss of vision is generally associated with poisoning following swallowing. Initial visual symptoms include blurring or dimness, changes in color perception, pain and tenderness, and dilated unreactive pupils.

Carcinogenicity

Methyl isobutyl ketone; IARC Group 2B: Possibly carcinogenic to humans

Other components of this product are not classified by NTP, IARC, or OSHA as carcinogens.

Section 12

Ecological Information

96-hr LC50 Bluegill Sunfish
380 mg/l, Practically Non-Toxic

96-brLC 50 Rainbow Trout
340 mg/l Practically Non-Toxic

48-h LC50 Daphnia Magna
16 mg/l, Slightly Toxic

Persistence and Degradability

Not known

Bioaccumulative Potential

Not known

Mobility in Soil

Not known

Section 13

Disposal Information

Do not discharge into waterways or sewer systems. Dispose of in accordance with government regulations. US EPA waste code D001 (ignitability characteristic).

Section 14 Transport Information

UN Number: 1866
Proper shipping name: Resin solution
Hazard class: 3
Packing group: III

Section 15 Regulatory Information

TSCA Inventory Status

All ingredients are on the TSCA inventory.

SARA Title III Section 311/312 Hazard Categories

Immediate (acute), Delayed (chronic), Fire

SARA Title III Section

The components listed below are subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right to Know Act of 1986 (EPCRA or SARA Title III) and 40 CFR 372.

Component	CAS #	313 Listed	%	RQ (lb)
N-methyl-2-pyrrolidone	872-50-4	Yes	34	-
Methyl isobutyl ketone	108-10-1	Yes	≈0.1	5000
1,2-Benzenedicarboxylic acid, 4,4'-carbonylbis-ar, ar'-diethyl ester, compd with with 1,3-benzenediamine	65701-07-7	No	60.48	-
Ethanol	64-17-5	No	4	-
Methanol	67-56-1	Yes	<0.2	5000

CERCLA RQ

See table above.

California Proposition 65

This product contains N-methyl-2-Pyrrolidone, a chemical known to the State of California to cause birth defects or other reproductive harm (developmental). Methyl isobutyl ketone, which is known to the State of California to cause cancer.

Section 16 Other Information

Date of Preparation or Revision

June 01, 2015

GHS Label Hazard Statement Codes

Signal Word: DANGER

H226	Flammable liquid and vapor
H302	Harmful if swallowed
H304	May be fatal if swallowed and enters airways
H311	Toxic in contact with skin
H315	Causes skin irritation
H317	May cause an allergic reaction.
H319	Causes serious eye irritation
H331	Toxic if inhaled
H335	May cause respiratory irritation
H351	Suspected of causing cancer
H360	May damage fertility or the unborn child
H373	May cause damage to organs through prolonged or repeated exposure
H401	Toxic to aquatic life
H411	Toxic to aquatic life with long lasting effects

GHS Label Precautionary Statement Codes

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from flames and hot surfaces. – No smoking.
P233	Keep container tightly closed.
P241	Use explosion-proof equipment.
P242	Use non-sparking tools.
P343	Take action to prevent static discharges.
P260	Do not breathe dust/ fume/ gas/ mist/ vapors/ spray
P264	Wash hands thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing should not be allowed out of the workplace
P273	Avoid release to the environment.
P280	Wear protective gloves, eye and face protection.
P281	Use personal protective equipment as required.
P301+310	IF SWALLOWED: Immediately call a poison center/doctor.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P303+P361:P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P303+313	If exposed or concerned: Get medical advice/attention.
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position

	comfortable for breathing.
P305+P251+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P307+P313	If exposed: Call a POISON CENTER or doctor/ physician.
P312	Call a POISON CENTER or doctor/physician if you feel unwell.
P321	Specific treatment: In case of skin contact, immediately wash skin with soap and water. Remove and wash contaminated clothing before reuse.
P331	Do NOT induce vomiting.
P332+P313	If skin irritation occurs: Get medical advice.
P337+P313	If eye irritation persists: Get medical advice.
P361+P364	Take off immediately all contaminated clothing and wash it before reuse.
P370+P378	In case of fire: Use water fog, dry chemical, foam, or CO2 for extinction.
P403+P233+P235	Store in a well-ventilated place. Keep container tightly closed. Keep cool.
P405	Store locked up.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

Abbreviations

ALC	Approximate Lethal Concentration
ANSI	American National Standards Institute
CAS	Chemical Abstracts Service
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	US Code of Federal Regulations
CO2	Carbon dioxide
DOT	US Department of Transportation
EPCRA	Emergency Planning and Community Right to Know Act
GHS	UN Globally Harmonized System of Classification and Labeling of Chemicals
HCS	Hazard Communication Standard
IARC	International Agency for Research on Cancer
ICAO/IATA	International Civil Aviation Organization/International Air Transport Association
IMO/IMDG	International Maritime Organization/International Maritime Dangerous Goods Code
LC50	Lethal concentration to 50% of exposed laboratory animals
LD50	Lethal dose to 50% of exposed laboratory animals
MSHA	US Mine Safety and Health Administration
NIOSH	US National Institute of Occupational Safety and Health
NA	Not available
NMP	N-methyl-2-pyrrolidone
NTP	National Toxicology Program
OARS	Occupational Alliance for Risk Science
OSHA	US Occupational Safety Health Administration
RQ	Reportable quantity
SARA	Superfund Amendments and Reauthorization Act
SDS	Safety data sheet
TSCA	Toxic Substances Control Act
UN	United Nations
US/USA	United States
WEEL	Workplace Environmental Exposure Levels

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