

RAKU-TOOL®  
IE-90A

90A Polyether

Tough, semi-flexible polyurethane elastomer



**RAMPF**  
discover the future

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### Processing

**The processing and material temperature should be between 68-77°F (20-25°C).**

For best results, de-air the material prior to casting, then pressurize to 60 psi until cured. If pigment has been added to the hardener component, it will separate during storage.

**Agitate hardener before mixing to ensure that the formula is homogeneous.**

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### Packaging

IE-90A Quart Kit	2.76 lbs.
IE-90A 1 Gal. Kit	11.04 lbs.
IE-90A 5 Gal. Kit	55.2 lbs.
IE-90A Drum Kit	621 lbs.

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### Storage

Original containers should be kept tightly sealed and stored at ambient temperatures 59-86°F (15°C to 30°C). If properly stored the products have the shelf-life indicated on the product label.

Partly used containers should always be sealed appropriately and used up as soon as possible.

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### Handling Precautions

Good workplace ventilation is to be ensured during processing. At the same time, the employer's liability insurance association's industrial hygiene safety regulations regarding the handling of reaction resins and their hardeners are to be observed. Please take heed of the appropriate safety data sheets.

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Our recommendations on the use of the material are based on many years of experience and current scientific and practical knowledge. They are, however, provided without any obligation on our part and do not relieve the buyer of the need for suitability tests. They do not constitute a legal relationship, nor are any protected third party rights whatsoever affected thereby.

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## 90A Polyether

Tough, semi-flexible polyurethane elastomer

### Key Properties

- Excellent physical properties after RT cure
- Free of mercury, MOCA or TDI

### Applications

- For hand-batch or vacuum assisted processing

### Processing Properties

			Resin (Isocyanate)	Hardener (Polyol)
Mix ratio		pbw	38	100
		pbv	33	100
Density	ASTM D-792	g/cm <sup>3</sup>	ca. 1.20	ca. 1.04
Viscosity at 77°F (25°C)	ASTM D-2393	cP	ca. 100	ca. 1,500

			Mixture
Mix viscosity at 77°F (25°C)	ASTM D-2393	cP	ca. 975
Gel time at 77°F (25°C)		min	7-13
Demold time at 77°F (25°C)		h	4-8

### Cured / Mechanical Properties (approximate values)

#### Cure 1: 7 days at 77°F

			Cure 1
Aspect	visual		Cream
Density	ASTM D-792	g/cm <sup>3</sup>	1.12
Shore hardness A	ASTM D-2240		80-90
Tensile strength	ASTM D-638	psi	1,750
Elongation at Break	ASTM D-638	%	180
Tear strength	ASTM D-624	pli	215
Linear shrinkage	ASTM D-2566	in/in	0.001-0.005



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HMS Ilt: Health = 2, Fire = 1, Physical Hazard = 1  
HMS PPE: B - Safety Glasses, Gloves

HEALTH	2
FLAMMABILITY	1
PHYSICAL HAZARD	1
PERSONAL PROTECTION	B

**3 COMPOSITION/INFORMATION ON INGREDIENTS**

Ingredients:  
Mixture  
Non hazardous material may not be listed to protect trade secret.

Case#	%	Chemical Name
101-68-9	60-70%	Diphenylmethane-4,4'-di isocyanate (MDI)
0	20-30%	Modified MDI
28447-40-5	5-10%	MDI mixed Isomers

Exact percentages have been withheld to protect trade secret.

**4 FIRST AID MEASURES**

**Inhalation:** Move exposed person to fresh air. Obtain medical attention immediately. Treatment is symptomatic for primary irritation or bronchospasm. If breathing is labored, oxygen should be administered by a qualified person.  
**Skin Contact:** After contact with skin, wash immediately with plenty of warm soapy water. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. An MDI study has demonstrated that a polyglycol-based skin cleanser (such as D-Tan™, PEG-400) or corn oil may be more effective than soap and water. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.  
**Eye Contact:** Immediately flush eyes with large amounts of water for at least 15 minutes, lifting eyelids occasionally to facilitate irrigation. Get immediate medical attention immediately.  
**Ingestion:** Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Provided the patient is conscious, wash out mouth with water. Get medical attention if symptoms occur.



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**5 FIRE FIGHTING MEASURES**

**Flash Point:** >392F  
Special protective equipment for firefighters: Fire fighters should wear appropriate protective equipment and self contained breathin apparatus (SCBA) with a full face-piece operated in positive pressure mode. PVC boots, gloves, safety helmet and protective clothing should be worn.

**Extinguishing Media**

**Suitable:** Foam, CO2 or dry powder.

**Unsuitable fire extinguisher:** Water may be used if no other available and then in copious quantities. Reaction between water and hot isocyanate may be vigorous. Prevent washings from entering water courses. Keep fire exposed containers cool by spraying with water, to avoid bursting.

**Hazards During Firefighting:** Combustion products may include: carbon monoxide, carbon dioxide, nitrogen oxides, hydrocarbons and HCN.

**Special Caution:** Due to a reaction with water, producing CO2 gas, a hazardous build up of pressure could result if contaminated containers are re-sealed. Containers may burst if overheated.

**6 ACCIDENTAL RELEASE MEASURES**

Keep away from drains and ground water. Do not discharge into drains. Inform proper authorities in case of environmental contamination. If spilled, absorb spillage onto sand earth or any suitable absorbent material. Leave to react for at least 30 minutes. Shovel into open top drums. Dispose of in a licensed facility only.

**7 HANDLING AND STORAGE**

**Handling Precautions:**

Eating, drinking and smoking should be prohibited when material is present. Employees must wash hands and face after using this material. Remove contaminated clothing and protective equipment before entering eating area.

**Storage Requirements:**

Keep container tightly closed in a cool, well ventilated area. Material will react with water, producing CO2 gas. A hazardous build up of pressure could result if contamination occurs. Do not re-seal contaminated containers. A blanket of dry nitrogen should be applied to NON contaminated containers before resealing. Do not store in containers made of copper, copper alloys or galvanized surfaces.



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**1** PRODUCT AND COMPANY IDENTIFICATION

**Manufacturer**

Rampf  
208 Kuntz St  
Saint Johns, MI 48879

**Vendor**

24 Hr. Emergency Contact: Chemtrec  
800-424-9300

Phone: 800-340-4563  
Fax: 989-224-1400

Contact:  
Phone:

Product Name: IE 90A Resin

SDS Number: 0023

Common Name: NEW CHEMICAL

Chemical Family: Isocyanate

Product Use: Polyurethane Component



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**2** HAZARDS IDENTIFICATION

**Classification of the substance or mixture**

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS):

Health, Acute toxicity, 4 Inhalation  
Health, Skin corrosion/irritation, 2  
Health, Respiratory or skin sensitization, 1 Respiratory  
Health, Serious Eye Damage/Eye Irritation, 2 B

**GHS Label elements, including precautionary statements**

GHS Signal Word: DANGER

GHS Hazard Pictograms:



**GHS Hazard Statements:**

H332 - Harmful if inhaled  
H315 - Causes skin irritation  
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled  
H320 - Causes eye irritation

**GHS Precautionary Statements:**

P103 - Read label before use.  
P261 - Avoid breathing dust/fume/gas/mist/vapors/spray.  
P286 - In case of inadequate ventilation wear respiratory protection.  
P282 - Wear protective gloves and face shield/eye protection.  
P304+340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.  
P304+312 - IF INHALED: Call a POISON CENTER or doctor/physician if you feel unwell.  
P305+351+338 - IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.  
P337 - If eye irritation persists: Get medical attention.  
P302+352 - IF ON SKIN: Wash with soap and water.  
P332 - If skin irritation occurs: Get medical attention.  
P501 - Dispose of contents/container in accordance with all local, regional, national and international regulations.

**Hazards not otherwise classified (HNOC) or not covered by GHS**

Route of Entry: Eyes; Inhalation; Skin; Ingestion;  
Target Organs: Unknown  
Inhalation: May cause allergy or asthma symptoms or breathing difficulties if inhaled.  
Skin Contact: Causes skin irritation.  
Eye Contact: May cause damage and irritation.



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**15 REGULATORY INFORMATION**

**Component (CAS#) [%] - CODES**

Polyether Polyol (0) [80-90%]

Phenyl Diethanolamine (120-07-0) [5-10%] TSCA

butane-1,4-diol (110-63-4) [1-5%] HAP, TSCA, TXAIR

**Regulatory CODE Descriptions**

TSCA = Toxic Substances Control Act

HAP = Hazardous Air Pollutants

TXAIR = TX Air Contaminants with Health Effects Screening Level

**16 OTHER INFORMATION**

Publication Date: 5/22/17

Revision No.

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*



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**7 HANDLING AND STORAGE**

**Handling Precautions:** Avoid breathing vapors or mist. Wash thoroughly after handling.  
**Storage Requirements:** Store in original container protected from direct sunlight in a cool, dry and well ventilated area. Maximum storage temperature 140F.

**8 EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Engineering Controls:** If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.  
**Personal Protective Equipment:** HMF5 PP, B, I Safety Glasses, Gloves  
 Splash goggles; Wear rubber or synthetic gloves.  
 If exposure to vapourmist is likely, wear a supplied air respirator.  
 Employees should wash their hands and face before eating, drinking or using tobacco products.

**Exposure Limits:** Aniline

**US, CA OEL Permissible Exposure Limit (PEL)**  
 7.5 mg/m<sup>3</sup>

**Remarks:** Can be absorbed through the skin.

**9 PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance:** White  
**Physical State:** Liquid  
**Spec Grav./Density:** 1.04  
**Boiling Point:** NA  
**Flash Point:** >440F  
**Vapor Density:** NA  
**Wt. Per Gal.** 8.66 Lbs.

**10 STABILITY AND REACTIVITY**

**Chemical Stability:** Stable  
**Conditions to Avoid:** Oxidizing agents, isocyanates.  
**Materials to Avoid:** Strong Oxidizing Agents.  
**Hazardous Decomposition:** By Fire or Thermal Decomposition: Carbon dioxide, carbon monoxide, oxides of nitrogen, dense black smoke and other undetermined compounds.  
**Hazardous Polymerization:** Will not occur.



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**11 TOXICOLOGICAL INFORMATION**

**Toxicity: Data for Polymer**  
 Oral (LD 50): Rat 1,800 mg/kg  
 Dermal (LD 50): Rabbit >2,000 mg/kg  
**Acute Effects:**  
 Eyes: No known significant effects or critical hazards.  
 Skin: No known significant effects or critical hazards.  
 Inhalation: No known significant effects or critical hazards.  
**Toxicity: N,N-Diethanolaniline**  
 Oral (LD50): >500 mg/kg body weight  
**Acute Effects:**  
 Skin: Slightly irritating  
 Eye: Severely Irritating

**12 ECOLOGICAL INFORMATION**

No known significant effects or critical hazards.

**13 DISPOSAL CONSIDERATIONS**

**14 TRANSPORT INFORMATION**

**Land Transportation (DOT):**  
 Not Regulated

**Sea Transportation:**  
 Not Regulated

**Air Transport (IATA):**  
 Not Regulated



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**1 PRODUCT AND COMPANY IDENTIFICATION**

**Manufacturer**

Rampf  
208 Kuntz St.  
Saint Johns, MI 48879

**Vendor**

Contact: 24 Hr. Emergency Contact: Chemtrec  
Phone: 800-340-4563  
800-424-9300

Phone: 800-340-4563  
Fax: 989-224-1400

Product Name: IE 90A Hardener  
SDS Number: 0022  
Common Name: NEW CHEMICAL  
Chemical Family: Polyol  
Product Use: Polyurethane Component

**2 HAZARDS IDENTIFICATION**

**Classification of the substance or mixture**

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS):  
Health, Aspiration hazard, 2  
Health, Serious Eye Damage/Eye Irritation, 2 B

**GHS Label elements, including precautionary statements**

GHS Signal Word: **WARNING**  
GHS Hazard Pictograms:



**GHS Hazard Statements:**

H305 - May be harmful if swallowed and enters airways  
H320 - Causes eye irritation

**GHS Precautionary Statements:**

P105 - Read label before use.  
P281 - Use personal protective equipment as required.  
P261 - Avoid breathing dust/fume/gas/mist/vapors/spray.

**Hazards not otherwise classified (HNOC) or not covered by GHS**

**Route of Entry:** Eyes; Inhalation; Skin; Ingestion;  
**Target Organs:** Kidneys; Liver; Skin; Eyes;  
**Inhalation:** No known effects  
**Skin Contact:** Not a known irritant  
**Eye Contact:** No known effects



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HMS III: Health = 1, Fire = 1, Physical Hazard = 0  
HMS PPE: B - Safety Glasses, Gloves

HMS	
HEALTH	1
FLAMMABILITY	1
PHYSICAL HAZARD	0
PERSONAL PROTECTION	B

**3 COMPOSITION/INFORMATION ON INGREDIENTS**

Ingredients:  
Mixture  
Non hazardous material may not be listed to protect trade secret.

Cas#	%	Chemical Name
*****	80-90%	Trade Secret
*****	5-10%	Trade Secret
*****	1-5%	Trade Secret

Exact percentages have been withheld to protect trade secret.

**4 FIRST AID MEASURES**

**Inhalation:** If symptoms develop, move victim to fresh air. If symptoms persist, obtain medical attention.  
**Skin Contact:** Wash with soap and water.  
**Eye Contact:** Check for and remove any contact lenses. Rinse immediately with plenty of water. Get medical attention if symptoms occur.  
**Ingestion:** Do not induce vomiting. Seek immediate medical attention

**5 FIRE FIGHTING MEASURES**

**Flash Point:** >440F  
A NIOSH approved self contained breathing apparatus with normal fire fighting equipment. Use alcohol foam, carbon dioxide or dry chemicals extinguishing media.

**Hazards During Firefighting:**  
Decomposition products may include the following materials: Carbon dioxide, carbon monoxide.  
Closed containers may burst in fire when overheated.

**6 ACCIDENTAL RELEASE MEASURES**

Keep away from drains and ground water. Do not discharge into drains. For minor spills, absorb with a suitable absorbent and containerize into open drums. Dispose of in a licensed facility only.



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**15 REGULATORY INFORMATION**

**Component (CAS#) [%] - CODES**

RQ(5000LBS), Diphenylmethane-4,4'-di isocyanate (MDI ) (101-68-8) [60-70%] CERCLA, HAP, MASS, NJHS, OSHAWAC, PA, SARA313, TSCA, TXAIR

Modified MDI (0) [20-30%]

MDI mixed Isomers (26447-40-5) [5-10%] TSCA

**Regulatory CODE Descriptions**

- RQ = Reportable Quantity
- CERCLA = Superfund clean up substance
- HAP = Hazardous Air Pollutants
- MASS = MA Massachusetts Hazardous Substances List
- NJHS = NJ Right-to-Know Hazardous Substances List
- OSHA = OSHA Workplace Air Contaminants
- PA = PA Right-to-Know List of Hazardous Substances
- SARA313 = SARA 313 Title III Toxic Chemicals
- TSCA = Toxic Substances Control Act
- TXAIR = TX Air Contaminants with Health Effects Screening Level

**16 OTHER INFORMATION**

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Revision No.

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**9 EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Engineering Controls:**

Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering control to keep worker exposure to airborne contaminants below any recommended or statutory limits. Diisocyanates can only be smelled if the occupational exposure limit has been exceeded considerably.

**Personal Protective Equipment:**

Medical supervision of all employees who handle or come in contact with respiratory sensitizers is recommended. Personnel with a history of asthma type conditions, bronchitis or skin sensitization conditions should not work with MDI based products.  
HMS P.P. B. | Safety Glasses, Gloves  
Employees should wash their hands and face before eating, drinking or using tobacco products. Wash contaminated clothing before reuse. Ensure that eyewash and safety shower stations are close to the workstation.

Employees handling this material should wear the following:

Chemical goggles; Chemical resistant gloves; Overalls or disposable coveralls.

Use a properly fitted air purifying or air fed respirator complying with an approved standard if a risk of inadequate ventilation is present.

**Exposure Limits:** Diphenylmethane 4,4'-diisocyanate

**ACGIH (TWA/TLV):** (United States, 3/2012)

**TWA:** 0.005 ppm 8 hours

**OSHA PEL (United States, 6/2010)**

**CEIL:** 0.02 ppm

**CEIL:** 0.2 mg/m<sup>3</sup>

**9 PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance:** Yellowish  
**Physical State:** Liquid  
**Spec Grav./Density:** 1.20  
**Boiling Point:** 382F

**Flash Point:** >382F  
**Vapor Density:** NA

**Wt. Per Gal.** 9.99 Lbs.

**10 STABILITY AND REACTIVITY**

**Chemical Stability:**

Stable at room temperature

**Conditions to Avoid:**

Water

**Materials to Avoid:** Water, alcohols, amines, bases and acids.

**Hazardous Decomposition:** May include: carbon oxides, nitrogen oxides, hydrocarbons and HCN

**Hazardous Polymerization:** May occur



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**11 TOXICOLOGICAL INFORMATION**

**Acute Toxicity: MDI Products**

Oral (LD 50): Rat >5000 mg/kg

Inhalation (LC 50): Rat 0.49mg/l

Dermal (LC 50): Rabbit >2000 mg/kg

Skin irritation: Yes

Eye irritation: Yes

Sensitization: Yes

**Chronic Toxicity:** May cause damage to organs through prolonged or repeated exposure if inhaled. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

**12 ECOLOGICAL INFORMATION**

Ingredient	Test	End Point	Exposure	Species	Result
Diphenylmethane 4,4'-diisocyanate	OECD 202 Daphnia sp. Acute Immobilisation Test	Acute	Acute EC50	24 Hrs. Static	Daphnia >1000 mg/l
	OECD 203 fish Acute Toxicity Test	Acute	Acute LC50	96 Hrs. Static	Fish >1000 mg/l
	OECD 211 Daphnia Magna Reproduction Test	Chronic	Chronic NOEC	21 days Semi Static	Daphnia >10 mg/l
	OECD 201 Algal Growth Inhibition Test	Chronic	Chronic NOEC	72 Hrs. Static	Algae 1640 mg/l

Ingredient is not readily biodegradable.

**13 DISPOSAL CONSIDERATIONS**

**14 TRANSPORT INFORMATION**

NA3082 Other Regulated Substances, Liquid, N.O.S. (Diphenylmethane-4,4'-Diisocyanate)

**Land Transportation (DOT):** Other regulated substances, liquid, n.o.s. (Diphenylmethane-4,4'-Diisocyanate)

**Proper shipping name:** Other regulated substances, liquid, n.o.s. (Diphenylmethane-4,4'-Diisocyanate)

**Hazard Class or Division:** 9

**UNNA Number:** NA3082

**Packaging Group:** III

**Hazard Label:** Class 9

**Additional Information:** Reportable Quantity 5000 lbs. Single containers less than 5000 lbs. are not regulated.

**See Transportation:** Not Regulated

**Air Transport (IATA):** Not Regulated