SDS: TUFF CAST ISO

Rev. Date: 1/27/2014

Section 1. IDENTIFICATION

Product Name: **TUFF CAST ISOCYANATE**
Product Identifier/Chemical Name: Polyurethane Isocyanate
Material Use: Component A of Polyurethane System
Supplier/Manufacturer: GOLDENWEST MANUFACTURING INCORPORATED
2036 Nevada City Hwy, Box 573, Grass Valley, CA 95945
530 272-1133 Fax 530 272-1070

Emergency Phone: Chemtrec: 800-424-9300

Section 2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

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

Health, Reproductive toxicity, 1 B
Health, Respiratory or skin sensitization, 1 Respiratory
Environmental, Hazards to the aquatic environment - Acute, 1
Environmental, Hazards to the aquatic environment - Chronic, 1 Health, Respiratory or skin sensitization, 1 Skin
Health, Skin corrosion/irritation, 2
Health, Carcinogenicity, 2
Health, Serious Eye Damage/Eye Irritation, 2 A
Health, Specific target organ toxicity - Single exposure, 3 Health, Acute toxicity, 4 Inhalation
Health, Acute toxicity, 4 Oral

GHS Label elements, including precautionary statements

GHS Signal Word: **DANGER**

GHS Hazard Pictograms:

GHS Hazard Statements:

H360 - May damage fertility or the unborn child
H334 - May cause allergy or asthma symptoms of breathing difficulties if inhaled H400 - Very toxic to aquatic life
H410 - Very toxic to aquatic life with long lasting effects H317 - May cause an allergic skin reaction
H315 - Causes skin irritation
H351 - Suspected of causing cancer
H319 - Causes serious eye irritation
H336 - May cause drowsiness or dizziness H335 - May cause respiratory irritation
H332 - Harmful if inhaled
H302 - Harmful if swallowed

GHS Precautionary Statements:

P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood. P260 - Do not breathe dust/fume/gas/mist/vapors/spray.
P273 - Avoid release to the environment.
P280 - Wear protective gloves/protective clothing/eye protection/face protection. P281 - Use personal protective equipment as required.
P284 - Wear respiratory protection.

P305+351+338 - IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P308+313 - IF exposed or concerned: Get medical advice/attention. P310 - Immediately call a POISON CENTER or doctor/physician. P391 - Collect spillage.
P405 - Store locked up.
P501 - Dispose of contents/container to a licensed waste disposal services provider.

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

Route of Entry: Eyes; Ingestion; Inhalation; Skin;

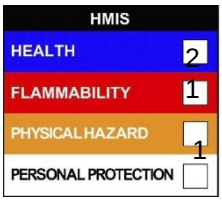
Target Organs: Respiratory system; Skin; Eyes;

Inhalation: At room temperature, MDI vapors are minimal due to low vapor pressure. However, heating, spraying, foaming, or otherwise mechanically dispersing (drumming, venting or pumping) operations may generate vapor or aerosol concentrations sufficient to cause irritation or other adverse effects. Excessive exposure may cause irritation of the eyes, upper respiratory tract and lungs. Severe overexposure may lead to pulmonary edema. May cause respiratory sensitization with asthma-like symptoms in susceptible individuals. MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized. Symptoms may include coughing, dryness of throat, headache, nausea, difficult breathing and a feeling of tightness in the chest. Effects may be delayed. Impaired lung function (decreased ventilator capacity) has been associated with overexposure to isocyanates Chronic: As a result of previous repeated overexposures or a single large dose, certain individuals develop isocyanate sensitization (chemical asthma) or tissue injury in the upper respiratory tract. Animal tests indicate skin contact alone may also lead to allergic respiratory reaction. These effects may be permanent. Any person developing asthmatic reaction or other sensitization should be removed from further exposure

Skin Contact: Product is a skin sensitizer. Causes irritation with symptoms of reddening, itching and swelling. Prolonged or repeated exposure can cause skin irritation, reddening, dermatitis, and in some individuals, sensitization. Skin contact may result in allergic skin reactions or respiratory sensitization, but is not expected to result in absorption of amounts sufficient to cause other adverse effects. May stain skin. Cured material is difficult to remove.

Eye Contact: As a liquid, vapor, aerosol or dust, may cause irritation, inflammation, and/or damage to sensitive eye tissue. Symptoms include reddening, tearing, stinging and swelling. May cause corneal injury. Prolonged contact may cause conjunctivitis.

NFPA: Health = 2, Fire = 1, Reactivity = 1, Specific Hazard= None
HMIS III: Health = 2, Fire = 1, Physical Hazard = 1



Section 3. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENTS:

CAS #	%	Chemical Name
101-68-8	25-50%	4,4'-Methylenediphenyl diisocyanate
HMIRC 7971	25-50%	Isocyanates, reaction product of polyol w/methylenediphenyldiisocyante
6846-50-0	16%	High Molecular weight plasticizer

Section 4. FIRST AID MEASURES

Eye Contact: Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin Contact: After contact with skin, wash immediately with plenty of soapy water. Get medical attention If irritation develops. Wash clothing before reuse. Clean shoes thoroughly before reuse. An MDI study has demonstrated that a poly glycol based skin cleaner (such as D-Tam TM, PEG-400) or corn oil may be more effective that soap and water.

Inhalation: Move person to fresh air. If breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by qualified personnel.

Ingestion: Wash out mouth with water. Do not induce vomiting unless directed to do so by a qualified medical person. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Note to Physician: No specific treatment. Treat symptomatically. Call medical doctor or poison control center immediately if large quantities have been ingested.

Section 5. FIRE-FIGHTING MEASURES

Flash Point:	Closed Cup: 219° C (426° F)
Flammable Limits:	Not explosive
Hazardous Thermal Decomposition Products:	Combustion products may include: carbon monoxide, carbon dioxide nitrogen oxides, hydrocarbons and HCN
Extinguishing Media:	
Suitable:	Use an extinguishing agent suitable for the surrounding fire.
Non Suitable:	None known
Special Exposure Hazards:	No specific hazard
Special Protective Equipment for Fire-Fighters:	Fire fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. PVC boots, gloves, safety helmet and protective clothing should be worn.
Special Remarks on Explosive Hazards:	Due to 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.

Section 6. ACCIDENTAL RELEASE MEASURES

Personal Protection:	Immediately contact emergency personnel. Evacuate the area. Keep upwind to avoid inhalation of vapors. Clean-up should only be performed by trained personnel. People dealing with major spillages should wear full protective clothing including respiratory protection. Use suitable protective equipment (section 8)
Environmental Precautions:	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
Methods for Cleaning Up:	Contain and absorb large spillages onto an inert, non-flammable adsorbent carrier (such as earth or sand). Shovel into open-top drums or plastic bags for further decontamination, if necessary. Wash spillage area clean with liquid decontaminant. Test atmosphere for MDI. Neutralize small spillages with decontaminant. Remove and properly dispose of residues. (See section 13 for disposal considerations.) Notify applicable government authorities if release is reportable. The CERCLA RQ for 4,4-MDI is 5,000 lbs. (see CERCLA in section 15.)

Section 7. HANDLING AND STORAGE

Handling:	Avoid personal contact with product or reaction mixture. Use only with adequate ventilation to ensure that the occupational exposure limit is not exceeded. The efficiency of the ventilation system must be monitored regularly because of the possibility of blockage. Avoid breathing aerosols, mists and vapors. (See section 8 – Exposure Control for details). Keep stocks of decontaminant readily available
Storage:	Keep container in a cool well-ventilated area. Keep container tightly closed. Keep away from moisture. Due to reaction with water producing CO2-gas, a hazardous build-up of pressure could result if contaminated are resealed. Do not reseal contaminated containers. Uncontaminated containers, free of moisture, may be resealed only after placing under a nitrogen blanket. Do not store in containers made of copper, copper alloys or galvanized surfaces.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Ingredient	**Exposure Limit**
Diphenylmethane 4,4'-diisocyanate	ACGIH TVL (United States, 2/2010) TWA: 0.005 ppm 8 hours OSHA PEL (United States, 6/2010) CEIL: 0.02 ppm CEIL: 0.2 mb/m³

Recommended Monitoring Procedures:	Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective device in the workplace.
Engineering Measures:	Use local exhaust ventilation to maintain airborne concentrations below TLV. Suitable respiratory equipment should be used in cases of insufficient ventilation of where operational procedures demand it. For guidance on engineering control measures refer to publications such as the ACGIH edition of "Industrial Ventilation, a manual of Recommended Practice:"

Hygiene Measures:	Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protection

Respiratory:	When the product is sprayed or heated without adequate ventilation, an approved MSHA/NIOSH positive-pressure, supplied-air respirator may be required. Air purifying respirators equipped with organic vapor cartridges and a HEPA (P100) particulate filter may be used under certain conditions when a cartridge change-out schedule has been developed in accordance with the OSHA respiratory protection standard (29 C.F.R. 1910.134).
Hands:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk of assessment indicates this is necessary.
Eyes:	Chemical safety goggles. If there is a potential for splashing use full face shield.
Skin:	The following protective materials are recommended: Gloves – neoprene, nitrile rubber, butyl rubber. Thin latex disposable gloves should be avoided for repeated long term use. Protective clothing should be selected and used in accordance with “Guidelines for the Selection of Chemical Protective Clothing” published by ACGIH.
Environmental Exposure Controls:	Emissions for ventilation or work process equipment should be checked to ensure that comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications may be applicable.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Non-pigmented liquid.	**Color:**	clear pale, yellow
Physical State:	Liquid	**Odor:**	slightly musty
Odor Threshold:	No data available	**Molecular Formula:**	N/A
Spec Grav./Density:	1.19	**Solubility:**	Not soluble in water; REACTS w/H2O
Viscosity:	180-240 mPas	**Percent Volatile:**	0%
Boiling Point:	>300° C	**Freezing/Melting Pt.:**	No data available
Flammability:	Not explosive	**Flash Point:**	219° C
Partition Coefficient:	No data available	**Vapor Density:**	8.5
Vapor Pressure:	No data available	**Auto-Ignition Temp:**	>600° C
pH:	No data available	**UFL/LFL:**	No data available
Evap. Rate:	<1		
Decomp Temp:	>300° C		

Section 10. STABILITY AND REACTIVITY

Chemical Stability:	Stable at room temperature. Reaction with water (moisture) produces CO2 gas. Exothermic reaction with materials containing active hydrogen groups. The reaction becomes progressively more vigorous and can be violent at higher temperatures if the miscibility of the reaction partners is good or is supported by stirring or by the presence of solvents. MDI is insoluble with, and heavier than water and sinks to the bottom but reacts slowly at the interface. A solid water insoluble layer of polyuria is formed at the interface by liberating carbon dioxide gas.
Possibility of hazardous Reactions:	Under normal conditions of storage and use, hazardous reactions will not occur.
Hazardous Polymerization:	Polymerization may occur at elevated temperatures in the presence of alkalis, tertiary amines and metal compounds.
Conditions to Avoid:	Water, alcohols, amines, bases and acids.
Hazardous Decomposition Products	Carbon monoxide, carbon dioxide, nitrogen oxides, hydrocarbons and HCN.

Section 11. TOXICOLOGICAL INFORMATION

Potential Acute Health Effects

Inhalation:	May cause sensitization by inhalation
Ingestion:	Low oral toxicity. Ingestion may cause irritation of the gastrointestinal tract.
Skin:	Irritating to skin. May cause sensitization by skin contact.
Eyes:	Irritation to eyes.

ACUTE TOXICITY

Product/Ingredient Name	Result	Species	Dose	Exposure
Isocyanates, reaction product of Polyol w/methylenediphenyl diisocyanate	LD50 Dermal	Rabbit Male Female	>9400 mg/kg	-
	LD50 Oral	Rat-female	>5000 mg/kg	-
	LC 50 Inhalation Dusts and Mists	Rat-male female	0.49 mg/L	4 hours
Diphenylmethane 4’4’-diisocyanate	LD50 Dermal	Rabbit Male Female	>9400 mg/kg	-
	LD50 Intraperitoneal	Rabbit-male	100 mg/kg	-
	LD50 Oral	Rat-male	>10000 mg/kg	-
	LC50 Inhalation Dusts and Mists	Rat	0.49 mg/L	4 hours

CHRONIC TOXICITY

Product/Ingredient Name	Result	Species	Dose	Exposure
Isocyanates, reaction product of polyol with methylenediphenyl diisocyanate	Chronic NOEC Inhalation Dusts and Mists	Rate-male Female	0.2 mg/m3	2 years-5 days per week

IRRITATION/CORROSION

Product/Ingredient Name	Result	Speies	Score/Exposure	Observation
Isocyanates, reaction product of polyol with methylenediphenyl diisocyanate	Skin – Irritant Eyes- non-irritant	Rabbit Rabbit	- - - -	- -
Diphenylmethane 4'4'-diisocyanate	Eyes- non-irritant Skin – Irritant	Rabbit Rabbit	- - - -	- -

SENSITIZER

Product/Ingredient Name	Route of Exposure	Species	Result
Isocyanates, reaction product of polyol with methylenediphenyl diisocyanate	skin Respiratory	Guinea pig Guinea pig	Sensitizing Sensitizing
Diphenylmethane 4'4'-diisocyanate	Skin Respiratory	mouse Guinea pig	Sensitizing Sensitizing

CARCINOGENICITY

Product/Ingredient Name	Result	Species	Dose	Exposure
Isocyanates, reaction product of polyol with methylenediphenyl diisocyanate	Negative Inhalation NOAEL	Rat-male female	1 mg/kg	2 years 5 days/wk.
Diphenylmethane 4'4'-diisocyanate	Positive Inhalation NOAEL	Rat-male female	1mg/m3	2 years 5 days/wk.

TERAOGENICITY

Product/Ingredient Name	Result	Species	Dose	Exposure
Isocyanates, reaction product of polyol with methylenediphenyl diisocyanate	Negative Inhalation	Rat-male female	12/mg/m3 NOEAL	20 days
Diphenylmethane 4'4'-diisocyanate	Negative Inhalation	Rat-male female	12/mg/m3 NOEAL	20 days

Potential Chronic Health Effects

Chronic Effects	Contains material that can cause target organ damage. Once sensitize, a severe allergic reaction may occur when subsequently exposed to very low levels.
Target Organs:	Contains material which causes damage to the following organs: Upper Respiratory Tract.
Carcinogenicity	Rats have been exposed for two years to a respirable aerosol of polymeric MDI which resulted in chronic pulmonary irritation at high concentrations. Only at the top level (6mg/m3), there was a significant incidence of a benign tumor of the lung(adenoma) and one malignant tumor (adenocarcinoma). There were no lung tumors at 1mg/m3

	and no effects at 0.2 mg/m3. Overall, the tumor incidence, both benign and malignant, and the number of animals with the tumors were not different from controls. The increased incidence of lung tumors is associated with prolonged respiratory irritation and the concurrent accumulation of yellow material in the lung, which occurred throughout the study. In absence of prolonged exposure to high concentrations leading to chronic irritation and lung damage, it is highly unlikely that tumor formation will occur.
Mutagenicity	There is no substantial evidence of mutagenic potential.
Teratogenicity	No birth defects were seen in two independent animal (rat) studies. Fetotoxicity was observed at doses that we extremely toxic (including lethal) to the mother. Fetotoxicity was not observed at doses not maternally toxic. The doses used in these studies were maximal, respirable concentrations, which are well in excess of defined occupational exposure limits.
Developmental Effects	No known significant effects or critical hazards
Fertility Effects	No known significant effects or critical hazards

Medical conditions aggravated by overexposure
Pre-existing respiratory and skin disorders involving any other target organs mentioned in this SDS as being at risk may be aggravated by over exposure to this product.

Section 12. ECOLOGICAL INFORMATION

Environmental Effects:	By comparison with an analogous product, the following values are anticipated: The measured Eco toxicity is that of the hydrolyzed product, generally under conditions maximizing productions of soluble species. Even so, the observed Eco toxicity is low/very low. A pond study showed gross contamination caused no significant toxic effects on a wide variety of flora n all tropic levels (including fish), no detectable diaminodiphenylmethane (MDA), and no evidence of bioaccumulation of MDI or MDA.
Aquatic Eco toxicity	Not Determined
Biodegradability	Not Determined
Mobility	By considering the production and use of the substance, it is unlikely that significant environmental exposure in the air or water will arise. Immiscible with water, but will react with water to produce inert and non-biodegradable solids. Conversion to soluble products, including diamino-diphenylmethane (MDA), is very low under the optimal laboratory conditions of good dispersion and low concentration. In air, the predominant degradation process is predicted to be relatively rapid OH radical attack, by calculation and by analogy with related diisocyanate.

Section 13. DISPOSAL CONSIDERATION

Disposal: Any disposal practice must be in compliance with all federal, state and local laws and regulations. Chemical additions, processing or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate or otherwise inappropriate. Waste characterization and disposal compliance are the responsibility solely of the party generating the waste or deciding to discard or dispose of the material. Do not allow material to enter sewers, a body of water, or contact the ground. Refer to RCRA 40 CFR 261, and/or any other appropriate federal, state or local requirements for proper classification information.

Section 14. TRANSPORT INFORMATION

Proper Shipping Name

DOT:	Other Regulated Substances, Liquid, N.O.S (Methylene Diphenyl Diisocyanate)
TDG:	Not regulated
IMDG:	Not regulated
IATA:	Not Regulated

DOT Classification	UN Number	Class	Packing Group	Additional information
	NA3082	9	III	Reportable Quantity 5000 lbs. Single containers less than 5000 lbs. are not required.

Section 15. REGULATORY INFORMATION

Component (CAS#) [%] - CODES

RQ(5000LBS), 4,4'-Methylenediphenyl diisocyanate (101-68-8) [20-30%] CERCLA, HAP, IARC, MASS, NJHS, OSHAWAC, PA, SARA313, TSCA, TXAIR

Isocyanic acid, polymethylenepolyphenylene ester (9016-87-9) [30-40%] IARC, SARA313, TSCA

Regulatory CODE Descriptions

RQ	=	Reportable Quantity
CERCLA	=	Superfund clean-up substance
HAP	=	Hazardous Air Pollutants
IARC	=	IARC Carcinogen Risks
MASS	=	MA Massachusetts Hazardous Substances List
NJHS	=	NJ Right-to-Know Hazardous Substances
OSHAWAC	=	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

Section 16. OTHER INFORMATION

Disclaimer:
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