

Material Safety Data Sheet**SUPPLIER**

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Product Identification

Product Name: AV-202-LV MULTIGROUT

Composition/Ingredient Information

Ingredient Name / CAS Number	Exposure Limits	Concentration
4,4'-Diphenylmethane Diisocyanate CAS #101-68-8	OSHA PEL: 0.02 ppm ACGIH TWA: 0.005 ppm	Trade Secret
Higher Oligomers of MDI CAS #9016-87-9	OSHA: Not established ACGIH: Not established	Trade Secret
Diphenylmethane Diisocyanate CAS #26447-40-5	OSHA PEL: Not established ACGIH TWA: Not established	Trade Secret
2,4 Toluene Diisocyanate CAS #584-84-9	OSHA PEL: 0.005 ppm ACGIH TWA: 0.005 ppm	Trade Secret
2,6 Toluene Diisocyanate CAS #91-08-7	OSHA PEL: 0.005 ppm ACGIH TWA: 0.005 ppm	Trade Secret
2-(2-ethoxy) Acetate CAS# 112-15-2	OSHA: PEL Not established ACGIH: Not established	Trade Secret

This product contains the following toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372:

2,4 Toluene Diisocyanate
2,6 Toluene Diisocyanate

Hazards Information

Primary Route(s) of Entry: Skin absorption, ingestion, and inhalation.

Health Hazards: May cause eye, skin, and respiratory tract irritation. Harmful if inhaled, may cause allergic respiratory reaction, may cause allergic skin reaction and may cause lung damage. Toxic gases/fumes are given off during burning or thermal decomposition.

Acute eye contact: Liquid, aerosols or vapors are irritating and can cause tearing, reddening and swelling. If left untreated, corneal damage can occur and injury is slow to heal. However, damage is usually reversible (see Emergency and first aid procedures).

Chronic eye contact: None found.

Acute skin contact: Isocyanates react with skin protein and moisture, and can cause irritation, which may include the following symptoms; reddening, swelling, rash, scaling or blistering. Cured material is difficult to remove.

Chronic skin contact: Prolonged contact can cause reddening, swelling, rash, scaling, blistering and in some cases skin sensitization. Individuals who have skin sensitization can develop these symptoms from contact with liquid vapors. Animal test have indicated that respiratory sensitization can result from skin contact with MDI/TDI. This data reinforces the need to prevent skin contact with MDI/TDI (see Toxicological information)

Acute ingestion: Can result in irritation and corrosive action in the mouth, stomach tissue and digestive tract. Symptoms can include sore throat, abdominal pain, nausea, vomiting, and diarrhea.

Chronic Ingestion: none found.

Acute Inhalation: MDI/TDI vapors or mist at concentrations above the TLV can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, and lungs) causing runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing obstruction). Persons with a preexisting, nonspecific bronchial hyperactivity can respond to concentrations below the TLV with similar symptoms as well as asthma attack. Exposure well above the TLV may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in the lungs). These effects are usually reversible. Chemical or hypersensitive pneumonitis, with flu-like symptoms (e.g., fever and chills) has also been reported. These symptoms can be delayed up to several hours after exposure.

Chronic inhalation: As a result of previous repeated overexposures or a single large dose, certain individuals develop isocyanate at levels well below the TLV. These symptoms, which can include chest tightness, wheezing, cough, shortness of breath or asthma attack, could be immediate or delayed (up to several hours after exposure), similar to many non-specific asthmatic responses. There are reports that once sensitized an individual can experience these symptoms upon exposure to dust, cold air, or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Over exposure to isocyanates has also been reported to cause lung damage (including decreased in lung function) which may be permanent. Sensitization can either be temporary or permanent.

Carcinogens: Neither MDI nor polymeric MDI are listed by the NTP, IARC or regulated by OSHA as carcinogens. TDI is listed as a carcinogen by IARC (2B) and NTP. TDI has been shown to cause cancer in lab animals when administered orally. Carcinogenicity through inhalation (most likely route of industrial exposure) has not been proven.

NTP: Not listed.

IARC: Not listed.

OSHA: Not regulated.

Medical conditions aggravated by exposure: asthma, other respiratory disorders (bronchitis, emphysema, bronchial hyperactivity), skin allergies and eczema

Carcinogens: Neither MDI/TDI nor polymeric MDI/TDI are listed by the NTP, IARC or regulated by OSHA as carcinogens.

NTP: Not listed.

IARC: Not listed.

OSHA: Not regulated.

Other: See results of two-year inhalation study (Toxicological information).

Medical conditions aggravated by exposure: asthma, other respiratory disorders (bronchitis, emphysema, bronchial hyperactivity), skin allergies and eczema.

First Aid Measures

Eyes: Flush with plenty of water, preferably, lukewarm water for at least 15 minutes, holding eyelids open. Consult physician or ophthalmologist for immediate follow-up.

Skin: Remove contaminated clothing. Wash affected skin thoroughly with soap and water. Wash contaminated clothing thoroughly before reuse. For severe exposure, get under safety shower after removing clothing, and then get medical attention. For lesser exposures, seek medical attention if irritation develops or persists after the area is washed.

Inhalation: Move to an area free from risk of further exposure. Administer oxygen or artificial respiration if needed. Obtain medical attention. Asthmatic-type symptoms may develop and may be immediate or delayed up to several hours. Consult physician should this occur.

Ingestion: Do not induce vomiting. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Give one (1) to two (2) cups of milk or water to drink. Seek immediate medical attention. (Never give anything by mouth to an unconscious or convulsing person.)

Note to physician:

Respiratory: This compound is a known pulmonary sensitizer. Treatment is essentially symptomatic. An individual having a skin or pulmonary sensitization reaction to this material should be removed from exposure to any isocyanate.

Skin: This compound is a known skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burns. If burned, treat as thermal burn.

Eyes: Stain for evidence of corneal injury. If cornea is burned, instill antibiotic steroid preparation frequently. Work place vapors have produced reversible corneal epithelial edema impairing vision.

Ingestion: Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of this compound.

Fire and Explosion Hazards

Flash Point: >212°F (100°C) PMCC

Flammable Limits: Not determined.

Extinguishing Media: Dry chemical, carbon dioxide, foam, and water spray for large fires.

Special Fire Fighting Procedures: Full emergency equipment with self-contained breathing apparatus and full protective clothing.

Unusual Fire and Explosion Hazards: Toxic fumes (carbon dioxide, carbon monoxide, carbon dioxide, nitrogen oxides, traces of cyanic acid, and TDI vapors) are released in fire situations. Downwind personnel must be evacuated. At temperatures >400°F polymeric MDI can polymerize and decompose which can build up pressure in closed containers making explosive rupture possible.

Accidental Release Measures

Spill or Leak Procedures: Eliminate all ignition sources and evacuate spill area; with adequate ventilation. Dike spill to prevent entry into water system.

Major spill: If transportation spill, call Chemtrec. If temporary control of isocyanate vapor is required, a blanket of protection foam (available from most fire departments) may be placed over the spill. Large quantities may be pumped into closed, but not sealed container for disposal.

Minor spill: Cover the spill with an inert absorbent material. Place in a proper waste unsealed container; transport to well ventilated area (outside) and treat with neutralizing solution: mixture of water (80%) with non-ionic surfactant Tergitol TMN-10 (20%), or mixture of (90%) water, (8%) concentrated ammonia, (2%) detergent on spill and allow to react for 10 minutes. Alternately, pour water on the spill and allow reaction to occur for more than 30 minutes. Do not seal the drum for 48 hours to avoid possible pressure build up (CO₂). Wear respirator and other protective equipment for protection of eyes and skin during cleanup.

Handling and Storage

Storage: Store in a dry area between 64°F-86°F (18°-30°C).

Handling: Handling: Use only in well ventilated areas, unless used with recommended respiratory protection. Empty containers of this material may be hazardous since they retain product residues; observe all warnings and precautions listed for the product.

Special Sensitivity: If container is exposed to high heat, 400°F (204°C) it can be pressurized and possibly rupture. MDI/TDI reacts slowly with water to form CO₂ gas. This gas can cause sealed containers to expand and possibly rupture.

Precautions: Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected. Avoid contact with skin and eyes. Do not breathe aerosols or vapors. Warning properties (irritation of eyes, nose and throat or odor) are not adequate to prevent chronic overexposure from inhalation. This material can produce asthmatic sensitization upon either single inhalation exposure to a relatively high concentration or upon repeated inhalation exposure to lower concentrations. Exposure to vapors of heated MDI/TDI can be extremely dangerous. Employee education and training in the safe use and handling of this compound are required under the OSHA Hazard Communication Standard.

Exposure Controls and Personal Protection

Respiratory Protection: If exposure exceeds occupational exposure limits, use an appropriate NIOSH approved respirator. In case of spill or leak resulting in unknown concentration, use NIOSH approved supplied air respirator.

Ventilation: Mechanical general/local exhaust to control vapor or mist below maximum exposure limits.

Protective Clothing: Use permeation resistant gloves (butyl rubber, nitrile rubber and poly alcohol). However, please note that PVA degrades in water. Wear impervious clothing, including boots, lab coat, apron or coveralls.

Eye Protection: Liquid chemical goggles. Vapor resistant goggles should be worn when contact lenses are in use. In a splash hazard environment, chemical goggles should be used in combination with a full-face shield. Maintain an eye wash fountain and quick drench facilities in the work area.

Monitoring: Isocyanate exposure levels must be monitored. Monitoring of airborne isocyanates in the breathing zone of individuals should become part of the overall employee exposure characterization program. Monitoring techniques have been developed by NIOSH and OSHA.

Medical surveillance: Medical supervision of all employees who handle or come in contact with isocyanates is recommended. These should include pre-employment and periodic medical examinations with pulmonary function tests (FEC, FVC as a minimum). Persons with asthmatic-type conditions, chronic bronchitis, other chronic respiratory diseases or recurrent skin eczema or sensitization would be excluded from working with isocyanates. Once a person is diagnosed as sensitized to an isocyanate, no further exposure should be permitted.

Work/Hygienic Practices: Wash with soap and water after handling. Remove contaminated clothing and wash before next use.

Additional protective measures: Educate and train employees in safe use of this product. Follow all label instructions.

Physical and Chemical Properties

Physical form: Liquid
Color: Transparent brown
Odor: Faint musty odor
Odor threshold: Not established
Molecular weight: N/A
pH: Not established
Boiling Point: 406°F (208°C) at 5mm Hg for MDI/TDI
Melting/Freezing point: Below 32°F (0°C) for MDI/TDI
Viscosity: 200 cps @ 77°F (25°C)
Solubility in Water: Soluble, reacts rapidly with water to liberate carbon dioxide gas.
Specific Gravity: 1.24 @ 77°F (25°C)
Bulk density: 10.3 lbs. /gal.
% volatile by volume: 0%
Vapor Pressure: Less than 10-5 mm Hg @ 77°F (25°C) for MDI/TDI
Vapor Density: 8.5 (MDI/TDI) (air – 1)

Stability and Reactivity

Stability: This is a stable material.
Hazardous Polymerization: May occur; contact with moisture, other materials, which react with isocyanates, or temperatures about 400°F (204°C) may cause polymerization.
Incompatibility (materials to avoid): Water, amines, strong bases, alcohols will cause some corrosion to copper alloys and aluminum.
Hazardous Decomposition Products: By high heat and fire; carbon monoxide, oxides of nitrogen, traces of HCN, MDI/TDI vapors or aerosols.

Toxicological Information

Toxicity data: Diphenylmethane Diisocyanate (Monomeric and Polymeric)
Acute toxicity:
Oral LD50: Greater than 15,800 mg/kg (rat)
Dermal LD50: Greater than 5,010 but less than 7,940 mg/kg (rabbit)
Inhalation LC50: The 4-hour LC50 for polymeric MDI in rats ranges from 370 to 490 mg/m³. The LC50 for monomeric MDI was estimated to be between 172 and 187 mg/m³.
Eye effects: Slight to moderate irritation.
Skin effects: Slight to moderate irritation.
Sensitization: MDI/TDI has been shown to produce dermal sensitization in laboratory animals. Evidence of respiratory sensitization has also been observed in guinea pigs. In addition, there is some evidence suggestive of cross-sensitization between different types of diisocyanates.
Chronic toxicity: In a combined chronic inhalation toxicity/oncogenicity study, rats were exposed to an aerosol of polymeric MDI/TDI for 6 hours per day, 5 days per week for one or two years. The exposure concentrations were 0, 0.2, 1.0 and 6.0 mg/m³. Microscopic examination of tissues revealed the effects of irritation to the nasal cavity and lungs in animals exposed to 1.0 and 6.0 mg/m³. The No Observable Effect Level (NOEL) was 0.2 mg/m³.
Carcinogens: In the study described above (Chronic toxicity) the occurrence of pulmonary adenomas and single pulmonary adenocarcinoma was considered to be related to MDI. These tumors were observed only in rats exposed to the high concentration of 6.0 mg/m³.
Mutagenicity: Positive (Salmonella microcosm test with metabolic activation; cell transformation assay) as well as negative (mouse lymphoma specific locus mutation test with or without metabolic activation) results have been observed "in vitro". However, MDI was negative in an "in vivo" (mouse micronucleus) assay.
Developmental toxicity: Rats were exposed to polymeric MDI at air concentrations of 1, 1, 4 and 12 mg/m³ during days 6 – 15 of gestation. Maternal toxicity (including mortality) was observed at the highest concentration of 12 mg/m³ accompanied by embryo and fetal toxicity. However, no teratogenic effects were observed even at this lethal concentration.

Ecological Information

Ecology data: Diphenylmethane Diisocyanate (Monomeric and Polymeric)

Aquatic toxicity: LC50 – 24 hours (static): Greater than 500 mg/liter for *Daphnia magna*, *Limnea Stagnalis*, and Zebra fish (*Brachydanio rerio*) for both polymeric and monomeric MDI/TDI.

Disposal Considerations

Dispose of in accordance with local, state, and federal regulations.

Empty container precautions: Empty containers must be handled with care due to product residue. Decontaminate containers prior to disposal. Empty decontaminated containers should be crushed to prevent reuse. **DO NOT HEAT OR CUT EMPTY CONTAINER WITH ELECTRIC OR GAS TORCH** (see Fire and explosion hazard data). Gases may be highly toxic.

Transport Information

Technical shipping name: Methylene diphenyl diisocyanate – DOT (domestic surface)

Proper Shipping Name: Chemicals, N.O.I. (isocyanate, NMFC 60,000). Non-regulated

Hazard class or division: None

UN/NA Number: None

Packaging Group: None

Freight Class: 55

Hazardous substance: Methylene Diphenyl Diisocyanate

DOT product RQ lbs: 5000 lbs.

Hazard panel(s): None

Hazard Placard(s): None

*When in individual containers of less than the product RQ, this material ships as non-regulated.

IMO/MDG code (ocean)

Hazard class division number: non-regulated ICAO/IATA (air)

Regulatory Information

OSHA status: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200

TSCA status: On TSCA Inventory

CERCLA reportable quantity: 5000 lbs. for 4, 4'-Diphenylmethane Diisocyanate CAS #101-68-8

SARA TITLE III:

SECTION 302 extremely hazardous substances: None

SECTION 311/312 hazard categories: Immediate health hazard: Delayed health hazard; Reactive hazard

SECTION 313 toxic chemicals: Polymeric Diphenylmethane Diisocyanate CAS #9016-87-9, 100%; contained in this polymeric MDI product is 4,4'-Diphenylmethane Diisocyanate CAS #101-68-8, upper bound 45%.

RCRA status: MDI is not listed as a hazardous waste. To the best of our knowledge, MDI does not meet the criteria of a hazardous waste if discarded in its purchased form. However, under RCRA, it is the responsibility of the user of products to determine, at the time of disposal, whether a product meets any of the criteria for hazardous waste. This is because product uses, transformations, mixtures, processes, etc., may render the resulting material hazardous, under the criteria of ignitability, corrosivity, reactivity and toxicity characteristics under the new Toxicity Characteristics Leaching Procedure (TCLP) 40 Code of Federal Regulations 261.20-24.

Component Name / CAS Number	Concentration	State code
4,4'-Diphenylmethane Diisocyanate CAS #101-68-8	Upper bound 45%	PA1, FL, IL, MA NJ1, NJ4, CN2
Higher Oligomers of MDI CAS #9016-87-9	45-55%	PA3, NJ4
Diphenylmethane Diisocyanate CAS #26447-40-5	1-10%	PA3, NJ4
Phenyl isocyanate CAS number 103-71-9	Trace - ppm	MA

FL	Florida Substance list	PA1	Pennsylvania hazardous substance list
IL	Illinois Toxic Substance List	PA3	Pennsylvania non-hazardous present at 3% or greater
MA	Massachusetts hazardous substance list	CN2	Canada WHMIS ingredient disclosure list over 0.1%
NJ1	New Jersey hazardous substance list		
NJ4	New Jersey other – included in 5 predominant ingredients > 1%		
RI	Rhode Island list of designated substances		

Other Information

NFPA 704M ratings:	Health	Flammability	Reactivity	Other
	3	1	1	
0 – Insignificant				
1 – Slight				
2 – Moderate				
3 – High				
4 – Extreme				

HMIS ratings:	Health	Flammability	Reactivity	Other
	3*	1	1	
0 – Minimal				
1 – Slight				
2 – Moderate				
3 – Serious				
4 – Severe				
* Chronic health hazard				

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