MATERIAL SAFETY DATA SHEET

Biomerics, LLC
Product Safety & Regulatory Affairs
2700 South 900 West
Salt Lake City, UT 84119
USA

TRANSPORTATION EMERGENCY

CALL CHEMTREC:	(800) 424-9300
INTERNATIONAL:	(703) 527-3887

NON-TRANSPORTATION

Emergency Phone:	Call Chemtrec
Information Phone:	(888) 874-7787

1. Product and Company Identification

Product Name:	**Quadraflex™ ALE 75A-95A, 55D, 72D**
Material Number:	QFLEX-ALE-90A-000-000-000
Chemical Family:	Aliphatic thermoplastic polyurethane
Chemical Name:	Polyurethane elastomer
MSDS No.:	FM-251-QUADRAFLEX-MSDS-ALE-93A-000-000-01123-00

2. Hazards Identification

Emergency Overview

Caution: **Color:** clear/yellow **Form:** solid pellets **Odor:** mild

This Materials has no known health hazards.

See Section 11 for complete health hazard information.

3. Composition/Information on Ingredients

Hazardous components
This material has no known hazards under applicable laws.

4. First aid measures

Eye contact
In case of contact, flush eyes with plenty of lukewarm water. Get medical attention if irritation develops.

Skin contact
Get medical attention if thermal burn occurs.

Inhalation
If inhaled, remove to fresh air.

Ingestion
Get medical attention.

Notes to physician
In the event of possible diisocyanate exposure: Eyes: Stain for evidence of corneal injury. If cornea is burned, instill antibiotic/steroid preparation as needed. Workplace vapors could produce reversible corneal epithelial edema impairing vision. Skin: Treat symptomatically as for thermal burn. Ingestion: Treat symptomatically. Inhalation: Treatment is essentially symptomatic. An individual having a pulmonary sensitization reaction to this material should be removed from further exposure to any diisocyanate.

5. Fire-fighting measures

Suitable extinguishing media: Water, Foam, Dry chemical

Special Fire Fighting Procedures
Firefighters should be equipped with self-contained breathing apparatus to protect against potentially toxic and irritating fumes.

Unusual Fire/Explosion Hazards
Toxic and irritating gases/fumes may be given off during burning or thermal decomposition.
Solid does not readily release flammable vapors.

6. Accidental release measures

Spill and Leak Procedures
Pick up free solid for recycle and/ or disposal.
If molten, allow material to cool and place into an appropriate marked container for disposal.

7. Handling and storage

Storage temperature:
maximum: 30 °C (86 °F)

Storage period
Not Established

Handling/Storage Precautions
Handle in accordance with good industrial hygiene and safety practices. Wash thoroughly after handling. Avoid breathing dust. Containers should be kept tightly closed to prevent contamination. Material is hygroscopic and may absorb small amounts of atmospheric moisture. Store in well ventilated place. Use good housekeeping measures to prevent dust accumulations.

Handling Procedures
Loading and unloading may cause nuisance dust to form. Conduct any operations emitting fumes or vapors (including heat joining, cutting and or sealing of articles and clean up) under well ventilated conditions. Avoid breathing process vapors. Do not hold product for extended periods of time at elevated temperatures or allow thick masses of hot polymer to accumulate because they can decompose emitting hazardous gasses. Do not taste, swallow, or chew products. Wash thoroughly after processing. Do not store or consume food in processing areas. Fume condensates may include hazardous contaminants from additives. Condensate may be combustible and should be periodically removed from exhaust hoods, ductwork, and other surfaces. Impervious gloves should be worn during cleanup operations to prevent skin contact. Post thermal processing activities necessary to produce molded articles (such as cutting, sanding, sawing, grinding, drilling, or regrinding) may create dust or "fines". Powders, dust, and/ or fines may pose a dust explosion hazard. Electrostatic buildup may occur when pouring or transferring this product from its container. The spark produced may be sufficient to ignite vapors of flammable liquids. Always transfer product by means which void static buildup. Avoid pouring product directly from its container into combustible or flammable solvent. The major off-gasses from normal melt processing are expected to be water vapor and carbon dioxide. Other trace volatile organic components may also be emitted. Wash thoroughly after handling.

Further Info on Storage Conditions
Protect equipment (e.g. storage bins, conveyors, dust collectors) with explosion vents.

8. Exposure controls/personal protection

Industrial Hygiene/Ventilation Measures
During normal processing, use general dilution and local exhaust as necessary to control airborne vapors, mists, dusts and thermal decomposition products below appropriate airborne concentration standards/guidelines. Special ventilation and personal protective equipment (PPE) is required to control exposure to potentially harmful decomposition products whenever a TPU is heated to temperatures above its decomposition temperature. Examples would include hot knife cutting, grinding, or sawing.

Respiratory protection
In the absence of sufficient general dilution or local exhaust ventilation a NIOSH approved air-supplied respirator may be needed during die cleaning, high temperature processing, purging or when thermal decomposition is suspected.

Hand protection
Wear heat resistant gloves when handling molten material.

Eye protection
Safety glasses with side-shields

Skin and body protection
No special skin protection requirements during normal handling and use.

Additional Protective Measures
Employees should wash their hands and face before eating, drinking, or using tobacco products. Educate and train employees in the safe use and handling of this product.

9. Physical and chemical properties

Form:	solid
Appearance:	pellets
Color:	clear/yellow
Odor:	mild
pH:	not determined
Melting Point:	not determined
Flash point:	not determined
Lower explosion limit:	not determined
Upper explosion limit:	not determined
Specific Gravity:	1.04
Solubility in Water:	insoluble
Autoignition temperature:	not determined
Decomposition temperature:	>230° c
Softening point:	not determined
Bulk density:	not determined

10. Stability and reactivity

Hazardous Reactions
Hazardous polymerization does not occur.

Stability
Stable

Materials to avoid
None known.

Conditions to avoid
None known.

Hazardous decomposition products
By Fire and Thermal Decomposition: Carbon Dioxide; hydrogen cyanide;
Diisocyanate; Aldehydes, Carbon monoxide, Amines, Nitriles, nitrogen oxides (NOx), Hydrocarbons

11. Toxicological information

Toxicity Data for Quadraflex™ ALE 75A-95A, 55D, 72D
Toxicity Note
No data available for this product.

Potential Health Effects

Primary Routes of Entry: Inhalation, Skin Contact, Eye Contact
Medical Conditions Aggravated by Exposure: Respiratory disorders

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE

Inhalation
Acute Inhalation
For Product: Quadraflex™ ALE 75A-95A, 55D, 72D
Thermoplastic Polyurethane (TPU) is generally non-hazardous under ambient conditions. However, when the product is heated (i.e., during processing or thermal decomposition conditions), there is a potential for the release of diisocyanate vapors. Diisocyanate vapors or mist at
concentrations above the TLV or PEL can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, lungs) causing runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing obstruction). Persons with a preexisting, nonspecific bronchial hyperreactivity can respond to concentrations below the TLV or PEL with similar symptoms as well as asthma attack or asthma-like symptoms. Exposure well above the TLV or PEL may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in lungs). Chemical or hypersensitivity pneumonitis, with flu-like symptoms (e.g., fever, chills), has also been reported. These symptoms can be delayed up to several hours after exposure. These effects are usually reversible.

Chronic Inhalation
For Product: Quadraflex™ ALE 75A-95A, 55D, 72D
In the event of material decomposition due to exceeding the decomposition temperature of this product, release of isocyanate may occur. As a result of previous repeated overexposures or a single large dose, certain individuals may develop sensitization to diisocyanates (asthma or asthma-like symptoms) that may cause them to react to a later exposure to diisocyanates at levels well below the TLV or PEL. These symptoms, which can include chest tightness, wheezing, cough, shortness of breath or asthmatic attack, could be immediate or delayed up to several hours after exposure. Extreme asthmatic reactions can be life threatening. 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. Sensitization can be permanent. Chronic overexposure to diisocyanates has also been reported to cause lung damage (including fibrosis, decrease in lung function) that may be permanent.

Skin
Acute Skin
For Product: Quadraflex™ ALE 75A-95A, 55D, 72D
Contact with heated material can cause thermal burns.

Eye
Acute Eye
For Product: Quadraflex™ ALE 75A-95A, 55D, 72D
Vapors released from thermal decomposition may cause irritation with symptoms of burning and tearing.

Carcinogenicity:
No Carcinogenic substances as defined by IARC, NTP and/or OSHA

12. Ecological information

Ecological Data for Quadraflex™ ALE 75A-95A, 55D, 72D
Additional Ecotoxicological Remarks
No data available for this product.

13. Disposal considerations

Waste Disposal Method
Waste disposal should be in accordance with existing federal, state and local environmental control laws.

14. Transport information

Land transport (DOT)
Non-Regulated

Sea transport (IMDG)
Non-Regulated

Air transport (ICAO/IATA)
Non-Regulated

15. Regulatory information

United States Federal Regulations

OSHA Hazcom Standard Rating:	Non-Hazardous
US. Toxic Substances Control Act:	All ingredients are listed in the TSCA Inventory or are compliant with the TSCA Polymer Exemption Rule."

US. EPA CERCLA Hazardous Substances (40 CFR 302):
Components
None

SARA Section 311/312 Hazard Categories:
Non-hazardous under Section 311/312

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A):
Components
None

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required:
Components
None

US. EPA Resource Conservation and Recovery Act (RCRA) Composite List of Hazardous Wastes and Appendix VIII Hazardous Constituents (40 CFR 261):
Under RCRA, it is the responsibility of the person who generates a solid waste, as defined in 40 CFR 261.2, to determine if that waste is a hazardous waste.

State Right-To-Know Information

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

Massachusetts, New Jersey or Pennsylvania Right to Know Substance Lists:

This product is not known to contain any substances subject to the right-to-know disclosure requirements of the states of Massachusetts, New Jersey, or Pennsylvania.

California Prop. 65:
To the best of our knowledge, this product does not contain any of the listed chemicals, which the state of California has found to cause cancer, birth defects or other reproductive harm.

16. Other information

HMIS Rating

Health	0
Flammability	1
Physical Hazard	0

0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe
* = Chronic Health Hazard

The method of hazard communication for Biomerics LLC is comprised of Product Labels and Material Safety Data Sheets. HMIS and NFPA ratings are provided by Biomerics LLC as a customer service.

Contact person: Product Safety & Regulatory Affairs
Telephone: 801-355-2700
MSDS Number: FM-251-QUADRAFLEX-MSDS-ALE-93A-000-000-01123-00
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