MATERIAL SAFETY DATA SHEET

EMERGENCY TELEPHONE: 800-424-9300 (Chemtrec)

Lonza Inc.
17-17 Route 208 Fair Lawn, NJ 07410 800-777-1875 (9am - 5pm) 309-697-7200 (After 5pm)

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CHEMICAL NAME (active): N-Alkyl(C12-16)-N,N-dimethyl-N-benzylammonium chloride

APPROXIMATE WEIGHT % TWA/TLV

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Weight %</th>
<th>TWA/TLV</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-Alkyl(C12-16)-N,N-dimethyl-N-benzylammonium chloride</td>
<td>80</td>
<td>None established</td>
</tr>
<tr>
<td>Ethanol (CAS No. 64-17-5)</td>
<td>10</td>
<td>1000 ppm (OSHA-PEL)</td>
</tr>
<tr>
<td>Water (CAS No. 7732-18-5)</td>
<td>10</td>
<td>1000 ppm (ACGIH-TWA)</td>
</tr>
</tbody>
</table>

APPEARANCE Clear yellow liquid
VISCOSITY > 100 cps @ 25°C
BOILING POINT Not known
VAPOR DENSITY (Air=1) Not known
PERCENT VOLATILE (by weight) 20%
EVAPORATION RATE (Butyl Acetate=1) Not known

PH FLASH POINT 111°F (Setaflash)
LOWER EXPLOSION LIMIT (%) 3.3% (ethanol)
EXTINGUISHING MEDIA FOAM
DRY CHEMICAL X

SPECIAL FIRE FIGHTING PROCEDURES:
Wear NIOSH/MSHA approved self-contained breathing apparatus and protective clothing. Cool fire-exposed containers with water spray.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
Products of combustion are toxic. Heated solvent vapors can travel to an ignition source and flash back.
EFFECTS OF OVEREXPOSURE
Based upon animal toxicity information available for this and closely related materials, it is anticipated that direct contact will produce severe eye and skin irritation and/or chemical burns with possible irreversible damage. Ingestion can cause immediate burning pain in the mouth, throat and abdomen; severe swelling of the larynx. Ingestion can cause skeletal muscle paralysis affecting the ability to breathe; circulatory shock; and/or convulsions. May be fatal if ingested. Solvent vapors or mists of product may cause irritation of mucous membranes. Prolonged inhalation of solvent vapors may produce drowsiness, lassitude and inability to concentrate.

OVEREXPOSURE MAY AGGRAVATE EXISTING CONDITIONS:
No conditions identified.

EMERGENCY AND FIRST AID PROCEDURES:
Eyes: Flush eyes with large amounts of running water for at least 15 minutes. Hold eyelids apart to ensure rinsing of the entire surface of the eye and lids with water. Get immediate medical attention. If physician is not available, flush for an additional 15 minutes and then transport victim to medical care.

Skin: Wash with large amounts of running water, and soap if available, for 15 minutes. Remove contaminated clothing and shoes. Get immediate medical attention. Wash clothing and decontaminate shoes before reuse.

Ingestion: If swallowed, immediately give 3-4 glasses of milk (if unavailable, give water). DO NOT induce vomiting. If vomiting occurs, give fluids again. Get immediate medical attention. Have physician determine if patient's condition allows for induction of vomiting or evacuation of the stomach. Do not give anything by mouth to a convulsing or unconscious person. (See "Note to Physician" below.)

Inhalation: Remove from area to fresh air. If not breathing, clear airway and start artificial respiration. If victim is having trouble breathing, give supplemental oxygen, if available. Get immediate medical attention.

CHEMICALS LISTED AS CARCINOGEN BY:

NATIONAL TOXICOLOGY PROGRAM - No
I.A.R.C. MONOGRAPHS - No
OSHA - No

NOTE TO PHYSICIAN:
Probable mucosal damage may contraindicate the use of gastric lavage. Take measures against circulatory shock. Breathing may be assisted with support. Administer oxygen if necessary.
CHEMICALS LISTED AS CARCINOGEN BY:

NATIONAL TOXICOLOGY PROGRAM - No
I.A.R.C. MONOGRAPHS - No
OSHA - No

HAZARDOUS DECOMPOSITION PRODUCTS
Thermal decomposition may produce toxic vapors/fumes of hydrogen chloride, amines and other organic materials, and oxides of carbon and nitrogen.

HAZARDOUS POLYMERIZATION CONDITIONS TO AVOID
MAY WILL NOT X None known
OCCUR OCCUR

INCOMPATIBILITY (MATERIALS TO AVOID)
WATER OTHER X Strong oxidizing or reducing agents.

STEPS TO BE TAKEN IN CASE OF SPILL OR RELEASE
DANGER! Corrosive and flammable material. Wear appropriate protective equipment and respiratory protection where mists or vapors of unknown concentrations may be generated (self-contained breathing apparatus preferred).

Dike and contain spill with inert material (sand, earth, etc.). Transfer the liquid and solid separately to containers for recovery or disposal. Keep spill out of sewers and open bodies of water.

WASTE DISPOSAL METHODS
Dispose of in compliance with all Federal, state and local laws and regulations. Incineration is the preferred method.

CONTAINER DISPOSAL
Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration if allowed by state and local authorities. If burned, avoid contact with smoke.
ENGINEERING CONTROLS
In processes where dusts, airborne particulates, mists or vapors may be generated, proper ventilation must be provided in accordance with good ventilation practices.

RESPIRATORY PROTECTION
In processes where dusts, airborne particulates, mists or vapors may be generated, a NIOSH/MSHA jointly approved respirator is advised in the absence of proper environmental controls.

PROTECTIVE GLOVES
Rubber or neoprene, when needed, to prevent skin contact.

EYE PROTECTION
Wear chemical splash goggles where there is a potential for eye contact. Use safety glasses with side shields under normal use conditions.

OTHER PROTECTIVE EQUIPMENT
Eye wash; safety shower; protective clothing (long sleeves, coveralls or other, as appropriate), when needed, to prevent skin contact.

PRECAUTIONS FOR STORAGE AND HANDLING:
Keep containers closed when not in use. Maximum storage temperature: 140°F. Keep from freezing. Do not contaminate drinking water, food or feed by storage or disposal.

TOXICITY
ACUTE
For Uniquat QAC-80:
- oral LD_{50} (rat): 404 mg/kg
- dermal LD_{50} (rabbit): 3346 mg/kg
- eye irritation (rabbit): Severe irritation that did not clear by day 3, post dose.
- skin irritation (rabbit): Severe irritation that did not clear by day 3, post dose.
- skin corrosivity (rabbit - DOT): Corrosive

For Alkyldimethylbenzylammonium chloride:
- photoallergenicity/sensitization (guinea pig - Buehler): Not photoallergenic or a contact sensitizer.

GENOTOXICITY/MUTAGENICITY
For Alkyldimethylbenzylammonium chloride:
- Ames Asssay (in vitro - rat hepatocytes): Not mutagenic with or without metabolic activation.
- Chromosome Abberation (in vitro - human lymphocytes): Not mutagenic with or without metabolic activation.

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**TOXICITY (continued)**

**REPRODUCTIVE/DEVELOPMENTAL**

For Uniquat QAC-80:
- developmental (rat-oral): No evidence of developmental or fetotoxic effects observed at exposure doses ranging from 10 to 50 mg/kg/day from day 6 through 15 of gestation.

For Alkyldimethylbenzylammonium chloride:
- developmental (rat-oral): NOAEL - 10 mg/kg/day for both maternal and neonatal. No evidence of developmental toxicity effects was observed at exposure doses ranging from 10-100 mg/kg/day administered from day 6 through 18 of gestation. Clear signs of maternal toxicity were observed at the high-dose level of 100 mg/kg/day.
- developmental (rabbit-oral): NOAEL - 3 mg/kg/day for both maternal and neonatal. No evidence of developmental toxicity effects was observed at exposure doses ranging from 1 to 9 mg/kg/day administered from day 6 through 18 of gestation. Clear signs of maternal toxicity were observed at the high-dose level of 9 mg/kg/day.
- reproductive/developmental (rat - two generation feeding): NOAEL - 1000 ppm. Neonatal and maternal adverse effects were observed in animals dosed at 2000 ppm.

**SUBCHRONIC**

For Alkyldimethylbenzylammonium chloride:
- oral toxicity (dog - 8 week - feeding): No adverse systemic or target organ effects were noted at dosage levels ranging from 400 to 1600 ppm in the diet. Slightly reduced weight gain and cholesterol values were observed in the 1200 and 1600 ppm exposure dose groups.
- oral toxicity (rat - 90 day - feeding): No systemic or target organ effects were observed at a dosage level of approximately 500 ppm in the diet. Adverse effects were noted at the higher dosage levels of 1000 and 4000 ppm.
- dermal toxicity (rat - 90 day): No systemic toxicity effects were noted in any of the exposure groups; however, slight irritation was observed in all treatment groups up to 20 mg/kg/day.

**CHRONIC**

For Alkyldimethylbenzylammonium chloride:
- oral toxicity (dog - 1 year - feeding): NOAEL - 400 ppm. Clear treatment related effects were observed in the high dosage level group, 1200 ppm. No specific target organ toxicity was observed and treatment had no effect on survival.
- oral toxicity/oncogenicity (rat - 2 year): NOAEL - 1000 ppm. Treatment related effects were noted in high-dosage level group, 2000 ppm. Survival and tumor incidences, as compared with controls, were not effected.

**ECOTOXICITY**

**AQUATIC**

For Uniquat QAC-80:
- \( LC_{50} \) (bluegill sunfish - 96 hour, static): 2.35 mg/l
- \( LC_{50} \) (rainbow trout - 96 hour, static): 7.8 mg/l
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**ECOTOXICITY (continued)**

**AQUATIC**

For Alkyldimethylbenzylammonium chloride:
- LC<sub>50</sub> (bluegill sunfish – 96 hour, static): 0.52 mg/l
- LC<sub>50</sub> (rainbow trout – 96 hour, static): 0.93 mg/l
- LC<sub>50</sub> (sheepshead minnow – 96 hour, static): 0.86 mg/l
- EC<sub>50</sub> (Daphnia magna – 48 hour, static): 0.058 mg/l
- LC<sub>50</sub> (mysid shrimp – 96 hour, static): 0.092 mg/l

******************** X - MISCELLANEOUS AND REGULATORY INFORMATION **********************

**FEDERAL LEVEL REGULATIONS:**

**TOXIC SUBSTANCES CONTROL ACT (TSCA INVENTORY) STATUS:**

The components of this product are currently listed on the EPA TSCA 8(b) inventory.

**TSCA Section 12(b) Export Notification**

Components present in this product which, if exported, could require either annual or one-time reporting under this regulation are as follows:

<table>
<thead>
<tr>
<th>Typical Maximum Chemical Name</th>
<th>CAS Number</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>None known</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**US EPA Regulation on Pesticides:**

This material is not an EPA FIFRA registered pesticide. This product cannot be used in the United States as a commercial antimicrobial agent without first obtaining an EPA FIFRA registration. This product may be used for non-antimicrobial application(s) and for all research and development (R&D) applications including as a potential antimicrobial agent.

**CERCLA (Comprehensive Environmental Response, Compensation and Liability Act of 1980) requires notification of the National Response Center (Telephone 800-424-8802) in the event of a release of quantities of the following hazardous materials contained in this product, if the release is equal to or greater than the Reportable Quantities (RQs) listed in 40 CFR 302.4:**

<table>
<thead>
<tr>
<th>Typical Maximum Chemical Name</th>
<th>CAS Number</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>None known</td>
<td></td>
<td></td>
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</table>

**SARA Title III, Sections 302/304 (Superfund Amendments and Reauthorization act of 1986) - This act requires emergency planning, including agency notification, for possible release of the following components of this material, based upon the Threshold Planning Quantities (TPQs) and release Reportable Quantities (RQs) listed for the Components in 40 CFR 355:**

<table>
<thead>
<tr>
<th>Typical Maximum Chemical Name</th>
<th>CAS Number</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>None known</td>
<td></td>
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</table>
95398 Uniquat QAC-80

FEDERAL LEVEL REGULATIONS (continued):

SARA Title III Sections 311/312 - This act requires reporting under the Community Right-to-Know provisions due to the inclusion of the following components of this material in one or more of the five hazard categories listed in 40 CFR 370:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-Alkyl(C12-16)-N,N-dimethyl-N-benzylammonium chloride</td>
<td>68424-85-1</td>
<td>A</td>
</tr>
<tr>
<td>Ethanol</td>
<td>64-17-5</td>
<td>F</td>
</tr>
</tbody>
</table>

*) The five hazard categories are as follows: F=FIRE HAZARD; S=SUDDEN RELEASE OF PRESSURE; R=REACTIVE; A=IMMEDIATE (ACUTE) HEALTH HAZARD; C=DELAYED (CHRONIC) HEALTH HAZARD

SARA Title III Section 313 - This act requires submission of annual reports off the releases of the following components of this material if the threshold reporting quantities as listed in 40 CFR 372, are met or exceeded:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>None known</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

STATE RIGHT-TO-KNOW REGULATIONS:

CALIFORNIA PROPOSITION 65 - Components present in this material which the State of California has found to cause cancer, birth defects or other reproductive harm are as follows:

AS A CANCER HAZARD

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaldehyde</td>
<td>75-07-0</td>
<td>1 ppm</td>
</tr>
<tr>
<td>Benzene</td>
<td>71-43-2</td>
<td>200 ppm</td>
</tr>
<tr>
<td>Benzyl chloride</td>
<td>100-44-7</td>
<td>100 ppm</td>
</tr>
<tr>
<td>N-Nitrosodimethylamine</td>
<td>62-75-9</td>
<td>1 ppm</td>
</tr>
<tr>
<td>Propylene oxide</td>
<td>75-56-9</td>
<td>10 ppm</td>
</tr>
</tbody>
</table>

AS A REPRODUCTIVE HAZARD

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>71-43-2</td>
<td>200 ppm</td>
</tr>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>300 ppm</td>
</tr>
</tbody>
</table>

MASSACHUSETTS Right-to-Know - The following components of this material are included in the Massachusetts Substance List and are present at or above reportable levels:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>71-43-2</td>
<td>100 ppm</td>
</tr>
<tr>
<td>Benzyl chloride</td>
<td>100-44-7</td>
<td>100 ppm</td>
</tr>
<tr>
<td>Ethanol</td>
<td>64-17-5</td>
<td>10%</td>
</tr>
<tr>
<td>N-Nitrosodimethylamine</td>
<td>62-75-9</td>
<td>1 ppm</td>
</tr>
<tr>
<td>Propylene oxide</td>
<td>75-56-9</td>
<td>10 ppm</td>
</tr>
</tbody>
</table>
**STATE RIGHT-TO-KNOW REGULATIONS** (continued):

**MICHIGAN** Critical Materials - The following components of this material are included in the Michigan Critical Materials List:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>None known</td>
<td></td>
</tr>
</tbody>
</table>

**NEW JERSEY** Right-to-Know - The following components of this material are included in the New Jersey Hazardous Substance List and are present at or above reportable levels:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>Typical Maximum Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanol</td>
<td>64-17-5</td>
<td>10%</td>
</tr>
<tr>
<td>N-Alkyl(C12-16)-N,N-dimethyl-N-benzylammonium chloride</td>
<td>68424-85-1</td>
<td>80%</td>
</tr>
</tbody>
</table>

**PENNSYLVANIA** Right-to-Know - The following components of this material are included in the Pennsylvania Hazardous Substance List and are present at or above reportable levels:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>Typical Maximum Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>71-43-2</td>
<td>100 ppm</td>
</tr>
<tr>
<td>Ethanol</td>
<td>64-17-5</td>
<td>10%</td>
</tr>
</tbody>
</table>

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