Chemical Name: NITRIC ACID 20%
Manufacturer: VOPAK USA, INC
MAXCOM ID #: 300261813

Revision Date: 04/05/1999
PPE Respirator: See MSDS
PPE Eye / Face: Face shield.

Primary Hazards (Chemical Category)

Hazard: Medium Yellow
Category: 28 - Poisonous and / or Corrosive Substances (Non-Combustible)

Hazard:

Corrosive
Moderately Corrosive

Flammable / Combustible
N/A

Toxicity
N/A

Other Hazards
Irritant, Ingestion Potentially Lethal, Toxic Decomposition Products, Special Hazard-Oxidizer.

Reactive
N/A

Target Organ Effects
Lungs Respiratory System, Eyes, Cutaneous Hazard

Routes of Entry
Inhalation, Ingestion, Eyes, Skin Contact
Section 1. Chemical Product
Product Name: NITRIC ACID 20%
MSDS# CM0306
Date Issued: 4/5/99
Supersedes: New
Issued By: 000099
Synonym Not available.
Trade Names: Not available.
Material Uses Not available.

Section 2. Composition and Information on Ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS #</th>
<th>% by Weight</th>
<th>Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitric acid</td>
<td>7697-37-2</td>
<td>20</td>
<td>TWA: 2 (mg/m3) from OSHA (PEL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TWA: 2 STEL: 4 CEIL: 4 (ppm) from ACGIH (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TWA: 5 STEL: 10 CEIL: 10 (mg/m3)</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>80</td>
<td>TWA: 5 STEL: 4 (ppm)</td>
</tr>
</tbody>
</table>

Ingredients not precisely identified are proprietary or nonhazardous under Federal Hazard Communication Standard (29 CFR 1910.1200).

Section 3. Hazards Identification
Physical State and Appearance
Liquid.

Emergency Overview
DANGER!
Store in tightly closed container. Do not breathe vapor or mist. Avoid contact with a combustible material (wood, paper, oil, clothing...). Do not get on skin or clothing. Do not get in eyes. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling.

Routes of Entry
Dermal contact. Eye contact. Inhalation. Ingestion
Potential Acute Health Effects
Eyes
Hazardous in case of eye contact (irritant, corrosive).
Skin
Sensitization of the product: Not available. Hazardous in case of skin contact (corrosive, irritant). Skin contact may produce burns. Prolonged exposure may result in skin burns and ulcerations. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.
Inhalation
Hazardous in case of inhalation (lung irritant, lung corrosive). Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Over-exposure by inhalation may cause respiratory irritation.
Ingestion
May be fatal if swallowed. May cause burns to mouth, throat and stomach. Harmful if swallowed.
Potential Chronic Health Effects
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
Medical Conditions Aggravated by Overexposure:
Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

Overexposure /Signs/Symptoms
Not available.
See Toxicological Information (Section 11)

Section 4. First Aid Measures
Eye Contact
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact
If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim’s exposed skin, such as the hands:
Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Hazardous Skin Contact
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation
Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Hazardous Inhalation
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Hazardous Ingestion
Not available.

Notes to Physician
Not available.

Section 5. Fire Fighting Measures
Flammability of the Product
Non-flammable.
Auto-ignition Temperature
Not applicable.
Section 6. Accidental Release Measures

Small Spill
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill
Corrosive liquid. Oxidizing Material
Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Avoid contact with a combustible material (wood, paper, oil, clothing...). Keep substance damp using water spray. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7. Handling and Storage

Handling
Keep container dry. Keep away from heat. Keep away from sources of ignition. Keep away from combustible material. Do not ingest. Do not breathe gas/fumes/vapour/spray. Never add water to this product. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

Storage
Corrosive materials should be stored in a separate safety storage cabinet or room.

Section 8. Exposure Controls/Personal Protection

Engineering Controls
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection
Eyes
Face shield.
Body
Full suit.
Respiratory
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Hands
Gloves.
Feet
Boots.
Personal Protection in Case of a Large Spill
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Chemical Name or Product Name | Exposure Limits
--- | ---
Nitric acid 100% | TWA: 2 (mg/m3) from OSHA (PEL)
 | TWA: 2 STEL: 4 CEIL: 4 (ppm) from ACGIH (TLV)
 | TWA: 5 STEL: 10 CEIL: 10 (mg/m3)
 | TWA: 5 STEL: 4 (ppm)

Consult local authorities for acceptable exposure limits.

Section 9. Physical and Chemical Properties
Physical State and Appearance
Liquid.
Boiling/Condensation Point
The lowest known value is 82.6 deg C (180.7 deg F) (Nitric acid 100%). Weighted average: 96.52 deg C (205.7 deg F)
Melting/Freezing Point
May start to solidify at 0 deg C (32 deg F) based on data for: Water. Weighted average: -8.32 deg C (17 deg F)
Color
Not available.
Specific Gravity
Weighted average: 1.07 (Water = 1)
Vapor Pressure
The highest known value is 45 mm of Hg (at 20 deg C) (Nitric acid 100%).
Vapor Density
The highest known value is 2.17 (Air = 1) (Nitric acid 100%).
Volatility
Not available.
Odor Threshold
The highest known value is 0.29 ppm (Nitric acid 100%)
Evaporation Rate
Not available.
VOC
Not available.
Viscosity
Not available.
Solubility
Easily soluble in cold water.
pH (1% Soln/Water)
Acidic.
Odor
Not available.
Taste
Not available.
Physical Chemical Comments
Section 10. Stability and Reactivity
Stability and Reactivity
The product is stable.
Conditions of Instability
Not available.

Incompatibility with Various Substances
Slightly reactive to reactive with combustible materials, organic materials.
Hazardous Decomposition Products
Not available.
Hazardous Polymerization
Not available.

Section 11. Toxicological Information
Toxicity to Animals
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.
Acute toxicity of the vapor (LC50): 6250 ppm 4 hour(s) (Rat) (Calculated value for the mixture).
Chronic Effects on Humans
The substance is toxic to upper respiratory tract, skin, eyes, respiratory tract.
Other Toxic Effects on Humans
Hazardous in case of skin contact (corrosive, irritant), of eye contact (corrosive), of ingestion, of inhalation (lung irritant, lung corrosive).
Special Remarks on Toxicity to Animals
Not available.
Special Remarks on Chronic Effects on Humans
Not available.
Special Remarks on Other Toxic Effects on Humans
Not available.

Section 12. Ecological Information
Ecotoxicity
Not available.
BOD5 and COD
Not available.
Biodegradable/OECD
Not available.
Mobility
Not available.
Toxicity of the Products of Biodegradation
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.
Not available.
Special Remarks on the Products of Biodegradation
Not available.

Section 13. Disposal Considerations
Waste Information
Not available.
Waste Stream
Not available.
Consult an expert on disposal of waste and materials used in spill cleanup and ensure conformity to all federal, state and local disposal regulations. Regulatory requirements are subject to change and may differ from one location to another; the generator of the waste is responsible for proper waste disposal.

Section 14. Transport Information
DOT Classification
Class 8: Corrosive liquid.
Nitric Acid, Solution
UN1796
II

Marine Pollutant
Not available.
Hazardous Substances Reportable Quantity (Kg)
Not available.
Special Provisions for Transport
Not available.

Section 15. Regulatory Information
U.S. Federal Regulations
SARA 302/304 emergency planning and notification: Nitric acid 100%
CERCLA: Hazardous substances: Nitric acid 100%: 1 lbs. (0.4536 kg);
SARA 313 toxic chemical notification and release reporting: Nitric acid 100%: 1%
TSCA 8(b) inventory: Nitric acid 100%; Water
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Nitric acid 100%: fire, immediate health hazard, delayed health hazard

State Regulations
Rhode Island RTK hazardous substances: Nitric acid 100%
Pennsylvania RTK: Nitric acid 100%: (environmental hazard)
Florida: Nitric acid 100%
Minnesota: Nitric acid 100%
Massachusetts RTK: Nitric acid 100%
New Jersey: Nitric acid 100%
New Jersey spill list: Nitric acid 100%
California prop. 65: No products were found.

Section 16. Other Information
National Fire Protection Association (U.S.A.)
Health 2
Flammability 0
Reactivity 0
Specific Hazard

Other Special Considerations
Not available.

This mixture has not been tested as a whole, the data presented is based on the properties of the individual components.

--------------------------------- FOR ADDITIONAL INFORMATION ---------------------------------
CONTACT: MSDS COORDINATOR VOPAK USA INC.
DURING BUSINESS HOURS, PACIFIC TIME (425)889-3400
--------------------------------- NOTICE ---------------------------------
*************** VOPAK USA INC., ("VOPAK"), EXPRESSLY DISCLAIMS ***************
ALL EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A
PARTICULAR PURPOSE, WITH RESPECT TO THE PRODUCT OR INFORMATION PROVIDED HEREIN,
AND SHALL UNDER NO CIRCUMSTANCES BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL
DAMAGES.**

DO NOT USE INGREDIENT INFORMATION AND/OR INGREDIENT PERCENTAGES IN THIS MSDS
AS A PRODUCT SPECIFICATION. FOR PRODUCT SPECIFICATION INFORMATION REFER TO A
PRODUCT SPECIFICATION SHEET AND/OR A CERTIFICATE OF ANALYSIS. THESE CAN BE
OBTAINED FROM YOUR LOCAL VOPAK USA SALES OFFICE.

ALL INFORMATION APPEARING HEREIN IS BASED UPON DATA OBTAINED FROM THE
MANUFACTURER AND/OR RECOGNIZED TECHNICAL SOURCES. WHILE THE INFORMATION IS
BELIEVED TO BE ACCURATE, VOPAK MAKES NO REPRESENTATIONS AS TO ITS ACCURACY OR
SUFFICIENCY. CONDITIONS OF USE ARE BEYOND VOPAKS CONTROL AND THEREFORE USERS
ARE RESPONSIBLE TO VERIFY THIS DATA UNDER THEIR OWN OPERATING CONDITIONS TO
DETERMINE WHETHER THE PRODUCT IS SUITABLE FOR THEIR PARTICULAR PURPOSES AND THEY
ASSUME ALL RISKS OF THEIR USE, HANDLING, AND DISPOSAL OF THE PRODUCT, OR FROM
THE PUBLICATION OR USE OF, OR RELIANCE UPON, INFORMATION CONTAINED HEREIN.
THIS INFORMATION RELATES ONLY TO THE PRODUCT DESIGNATED HEREIN, AND DOES NOT
RELATE TO ITS USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY OTHER
PROCESS.

*** END OF MSDS ***