1 Identification

· Product identifier

· Product name: SM68 Standard 1: Al, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ho, In, K, La, Li, Lu, Mg, Mn, Na, Nd, Ni, P, Pb, Pr, Rb, Re, Sc, Se, Sm, Sr, Tb, Th, Tl, Tm, U, V, Y, Yb, Zn @ 100 µg/mL in 5% HNO3

· Part number: VHG-SM68-1-100

· Application of the substance / the mixture Reference material for laboratory use only

· Manufacturer/Supplier:
  VHG Labs, Inc
  LGC Standards
  276 Abby Road
  Manchester, NH 03103
  UNITED STATES OF AMERICA
  Tel : +1 (603) 622-7660
  Fax : +1 (603) 622-5180
  eMail : custsvc@vhglabs.com
  Web : www.vhglabs.com

· Information department:
  Product safety department
  eMail : sds-request@lgcgroup.com

· Emergency telephone number:
  INFOTRAC 24-hour Emergency telephone number:
  800-535-5053 (US & Canada);
  352-323-3500 (International)

2 Hazard(s) identification

· Classification of the substance or mixture

   GHS05 Corrosion

   Eye Dam. 1 H318 Causes serious eye damage.

   Skin Irrit. 2 H315 Causes skin irritation.

· Label elements

· GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).
Safety Data Sheet
acc. to OSHA HCS

Product name: SM68 Standard 1: Al, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ho, In, K, La, Li, Lu, Mg, Mn, Na, Nd, Ni, P, Pb, Pr, Rb, Re, Sc, Se, Sm, Sr, Tb, Th, Tl, Tm, U, V, Y, Yb, Zn @ 100 µg/mL in 5% HNO3

- Hazard pictograms

  GHS05

- Signal word Danger

- Hazard statements
  H315 Causes skin irritation.
  H318 Causes serious eye damage.

- Precautionary statements
  P280 Wear protective gloves.
  P280 Wear eye protection / face protection.
  P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  P310 Immediately call a POISON CENTER/doctor.
  P321 Specific treatment (see on this label).
  P332+P313 If skin irritation occurs: Get medical advice/attention.

- Classification system:

  - NFPA ratings (scale 0 - 4)
    
    Health = 2
    Fire = 0
    Reactivity = 0

  - HMIS-ratings (scale 0 - 4)
    
    HEALTH 2
    FIRE 0
    REACTIVITY 0

- Other hazards

  - Results of PBT and vPvB assessment
    - PBT: Not applicable.
    - vPvB: Not applicable.
3 Composition/information on ingredients

- Chemical characterization: Mixtures
- Description:
  Aqueous solution.
  Also contains substances at levels not considered to be hazardous.
- Dangerous components:

  | CAS: 7697-37-2 | Nitric acid | Ox. Liq. 2, H272; Skin Corr. 1A, H314 | ≤ 5% |

4 First-aid measures

- Description of first aid measures
- General information: Immediately remove any clothing soiled by the product.
- After inhalation: Supply fresh air; consult doctor in case of complaints.
- After skin contact:
  Immediately wash with water and soap and rinse thoroughly.
  If skin irritation continues, consult a doctor.
- After eye contact: Rinse opened eye for several minutes under running water. Then consult a doctor.
- After swallowing: Rinse mouth. Do not induce vomiting.
- Information for doctor:
- Most important symptoms and effects, both acute and delayed: No further relevant information available.
- Indication of any immediate medical attention and special treatment needed:
  No further relevant information available.

5 Fire-fighting measures

- Extinguishing media
- Suitable extinguishing agents:
  CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- Special hazards arising from the substance or mixture
  Formation of toxic gases is possible during heating or in case of fire.
- Advice for firefighters
- Protective equipment: Wear self-contained respiratory protective device.

(Contd. on page 4)
Product name: SM68 Standard 1: Al, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ho, In, K, La, Li, Lu, Mg, Mn, Na, Nd, Ni, P, Pb, Pr, Rb, Re, Sc, Se, Sm, Sr, Tb, Th, Tl, Tm, U, V, Y, Yb, Zn @ 100 µg/mL in 5% HNO3

6 Accidental release measures

- Personal precautions, protective equipment and emergency procedures
  Wear protective equipment. Keep unprotected persons away.
- Environmental precautions:
  Dilute with plenty of water.
  Do not allow to enter sewers/surface or ground water.
- Methods and material for containment and cleaning up:
  Use neutralizing agent.
  Dispose contaminated material as waste according to item 13.
  Absorb liquid components with liquid-binding material.
  DO NOT USE SAWDUST.
- Reference to other sections
  See Section 7 for information on safe handling.
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.

7 Handling and storage

- Handling:
- Precautions for safe handling Store in cool, dry place in tightly closed receptacles.
- Information about protection against explosions and fires: No special measures required.
- Conditions for safe storage, including any incompatibilities
- Storage:
- Requirements to be met by storerooms and receptacles:
  Store in a cool location.
  Please refer to the manufacturer's certificate for specific storage and transport temperature conditions.
  Store only in the original receptacle.
  Keep container in a well-ventilated place. Keep away from sources of ignition and heat.
- Information about storage in one common storage facility: Store away from foodstuffs.
- Further information about storage conditions: Keep receptacle tightly sealed.
- Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

- Additional information about design of technical systems: No further data; see item 7.

(Contd. on page 5)
Safety Data Sheet
acc. to OSHA HCS

Product name: SM68 Standard 1: Al, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ho, In, K, La, Li, Lu, Mg, Mn, Na, Nd, Ni, P, Pb, Pr, Rb, Re, Sc, Se, Sm, Sr, Tb, Th, Tl, Tm, U, V, Y, Yb, Zn @ 100 µg/mL in 5% HNO3

· Control parameters

<table>
<thead>
<tr>
<th>Components with limit values that require monitoring at the workplace:</th>
</tr>
</thead>
<tbody>
<tr>
<td>7697-37-2 Nitric acid</td>
</tr>
<tr>
<td>PEL Long-term value: 5 mg/m³, 2 ppm</td>
</tr>
<tr>
<td>REL Short-term value: 10 mg/m³, 4 ppm</td>
</tr>
<tr>
<td>Long-term value: 5 mg/m³, 2 ppm</td>
</tr>
<tr>
<td>TLV Short-term value: 10 mg/m³, 4 ppm</td>
</tr>
<tr>
<td>Long-term value: 5.2 mg/m³, 2 ppm</td>
</tr>
</tbody>
</table>

· Additional information: The lists that were valid during the creation were used as basis.

· Exposure controls

· Personal protective equipment:

· General protective and hygienic measures:
  Keep away from foodstuffs, beverages and feed.
  Immediately remove all soiled and contaminated clothing.
  Wash hands before breaks and at the end of work.
  Avoid contact with the skin.
  Avoid contact with the eyes and skin.

· Breathing equipment: Not required.

· Protection of hands:
  The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
  Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
  The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374

Protective gloves

· Material of gloves
  PVC gloves
  Neoprene gloves

· Penetration time of glove material
  The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

(Contd. on page 6)
# Safety Data Sheet

acc. to OSHA HCS

**Product name:** SM68 Standard 1: Al, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ho, In, K, La, Li, Lu, Mg, Mn, Na, Nd, Ni, P, Pb, Pr, Rb, Re, Sc, Se, Sm, Sr, Tb, Th, Tl, Tm, U, V, Y, Yb, Zn @ 100 µg/mL in 5% HNO3

- **Eye protection:**
  Tightly sealed goggles

## 9 Physical and chemical properties

<table>
<thead>
<tr>
<th>Information on basic physical and chemical properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Information</td>
</tr>
<tr>
<td>Appearance:</td>
</tr>
<tr>
<td>Form: Liquid</td>
</tr>
<tr>
<td>Color: Colorless</td>
</tr>
<tr>
<td>Odor: Odorless</td>
</tr>
<tr>
<td>Odor threshold: Not determined.</td>
</tr>
<tr>
<td>pH-value: Not determined.</td>
</tr>
</tbody>
</table>

- Change in condition                                 |
  Melting point/Melting range: Not determined.         |
  Boiling point/Boiling range: 100 °C (212 °F)          |

- Flash point: Not applicable.                         |

- Flammability (solid, gaseous): Not determined.       |

- Ignition temperature                                |
  Decomposition temperature: Not determined.           |
  Auto igniting: Product is not self-igniting.         |

- Danger of explosion:                                |
  Not determined.                                      |

- Explosion limits:                                   |
  Lower: Not determined.                               |
  Upper: Not determined.                               |

- Vapor pressure at 20 °C (68 °F): 23 hPa (17 mm Hg)   |

- Density: Not determined.                             |

- Relative density: Not determined.                    |

- Vapor density: Not determined.                       |

- Evaporation rate: Not determined.                    |
Product name: SM68 Standard 1: Al, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ho, In, K, La, Li, Lu, Mg, Mn, Na, Nd, Ni, P, Pb, Pr, Rb, Re, Sc, Se, Sm, Sr, Tb, Th, Tl, Tm, U, V, Y, Yb, Zn @ 100 µg/mL in 5% HNO₃

10 Stability and reactivity

- Reactivity: Stable under normal conditions.
- Chemical stability: Stable under normal conditions.
- Thermal decomposition / conditions to be avoided:
  Formation of toxic gases is possible during heating or in case of fire.
- Possibility of hazardous reactions: No dangerous reactions known.
- Conditions to avoid: Heat.
- Incompatible materials: Strong oxidizing agents.
- Hazardous decomposition products: Formation of toxic gases is possible during heating or in case of fire.

11 Toxicological information

- Information on toxicological effects
- Acute toxicity:
- LD/LC50 values that are relevant for classification:

<table>
<thead>
<tr>
<th>7697-37-2 Nitric acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral LDO 430 mg/kg (Human)</td>
</tr>
<tr>
<td>Inhalative LC50/4 h 130 mg/l (rat)</td>
</tr>
</tbody>
</table>

- Primary irritant effect:
  - on the skin: Irritant to skin and mucous membranes.
  - on the eye: Strong irritant with the danger of severe eye injury.
  - Sensitization: Based on available data, the classification criteria are not met.
- Additional toxicological information:
  The product shows the following dangers according to internally approved calculation methods for preparations:
  Irritant
### 12 Ecological information

**Toxicity**

**Aquatic toxicity:**

- 7697-37-2 Nitric acid
  - LC50/48: 180 mg/l (crustacean)

**Persistence and degradability** No further relevant information available.

**Behavior in environmental systems:**

**Bioaccumulative potential** No further relevant information available.

**Mobility in soil** No further relevant information available.

**Additional ecological information:**

**General notes:**

Water hazard class 1 (Self-assessment): slightly hazardous for water

- Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
- Must not reach bodies of water or drainage ditch undiluted or unneutralized.

**Results of PBT and vPvB assessment**

- **PBT:** Not applicable.
- **vPvB:** Not applicable.

**Other adverse effects** No further relevant information available.

### 13 Disposal considerations

**Waste treatment methods**

**Recommendation:**

Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
Product name: SM68 Standard 1: Al, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ho, In, K, La, Li, Lu, Mg, Mn, Na, Nd, Ni, P, Pb, Pr, Rb, Re, Sc, Se, Sm, Sr, Tb, Th, Tl, Tm, U, V, Y, Yb, Zn @ 100 µg/mL in 5% HNO3

- Uncleaned packagings:
- Recommendation: Dispose in accordance with national regulations.
- Recommended cleansing agent: Water, if necessary with cleansing agents.

### 14 Transport information

- **UN-Number**: UN3264
- **DOT, ADR, IMDG, IATA**: Corrosive liquid, acidic, inorganic, n.o.s. (Nitric acid)
- **DOT**: 3264 Corrosive liquid, acidic, inorganic, n.o.s. (Nitric acid)
- **IMDG, IATA**: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID)

- **Transport hazard class(es)**
- **DOT**
  - Class: 8 Corrosive substances
  - Label: 8

- **ADR, IMDG, IATA**
  - Class: 8 Corrosive substances
  - Label: 8

- **Packing group**
  - **DOT, ADR, IMDG, IATA**: III

- **Environmental hazards**: Not applicable.

- **Special precautions for user**: Warning: Corrosive substances
- **Danger code (Kemler)**: 80
- **EMS Number**: F-A,S-B
- **Segregation groups**: Acids
- **Stowage Category**: B
Product name: SM68 Standard 1: Al, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ho, In, K, La, Li, Lu, Mg, Mn, Na, Nd, Ni, P, Pb, Pr, Rb, Re, Sc, Se, Sm, Sr, Tb, Th, Tl, Tm, U, V, Y, Yb, Zn @ 100 µg/mL in 5% HNO3

- **Stowage Code**: SW2 Clear of living quarters.
- **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**: Not applicable.
- **UN "Model Regulation"**: UN 3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID), 8, III

### 15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
  - **Sara**
    - **Section 355 (extremely hazardous substances):**
      - 7697-37-2 Nitric acid
    - **Section 313 (Specific toxic chemical listings):**
      - 7697-37-2 Nitric acid
    - **TSCA (Toxic Substances Control Act):**
      - All ingredients are listed.
  - **Proposition 65**
    - **Chemicals known to cause cancer:**
      - None of the ingredients is listed.
    - **Chemicals known to cause reproductive toxicity for females:**
      - None of the ingredients is listed.
    - **Chemicals known to cause reproductive toxicity for males:**
      - None of the ingredients is listed.
    - **Chemicals known to cause developmental toxicity:**
      - None of the ingredients is listed.

- **Carcinogenic categories**
  - **EPA (Environmental Protection Agency)**
    - None of the ingredients is listed.
  - **TLV (Threshold Limit Value established by ACGIH)**
    - None of the ingredients is listed.
  - **NIOSH-Ca (National Institute for Occupational Safety and Health)**
    - None of the ingredients is listed.
Product name: SM68 Standard 1: Al, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ho, In, K, La, Li, Lu, Mg, Mn, Na, Nd, Ni, P, Pb, Pr, Rb, Re, Sc, Se, Sm, Sr, Tb, Th, Tl, Tm, U, V, Y, Yb, Zn @ 100 µg/mL in 5% HNO3

GHS label elements: The product is classified and labeled according to the Globally Harmonized System (GHS).

Hazard pictograms:

- Signal word: Danger
- Hazard statements:
  H315 Causes skin irritation.
  H318 Causes serious eye damage.
- Precautionary statements:
  P280 Wear protective gloves.
  P280 Wear eye protection / face protection.
  P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  P310 Immediately call a POISON CENTER/doctor.
  P321 Specific treatment (see on this label).
  P332+P313 If skin irritation occurs: Get medical advice/attention.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

Other information:
The information in this Safety Data Sheet meets the requirements of the United States OCCUPATIONAL SAFETY AND HEALTH ACT and regulations promulgated thereunder (29 CFR 1910.1200 et. seq.) This document is intended only as a guide to the appropriate precautionary handling of the material by a person trained in, or supervised by a person trained in, chemical handling. The user is responsible for determining the application. Depending on usage, protective clothing including eye and face guards and respirators must be used to avoid contact with material or breathing chemical vapors/fumes. Exposure to this product may have serious adverse health effects. This chemical may interact with other substances. Since the potential uses are so varied, we cannot warn of all of the potential dangers of use or interaction with other chemicals or materials. We warrant that the chemical meets the specifications set forth on the label. We (LGC/VHG/ARMI) disclaim any other warranties, expressed or implied with regard to the product supplied hereunder, its merchantability or its fitness for a particular purpose. The user should recognize that this product can cause severe injury and even death, especially if improperly handled or the known dangers of use are not heeded. Read all precautionary information.

Date of preparation / last revision: 04/13/2017 /

Abbreviations and acronyms:
  ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
  IMDG: International Maritime Code for Dangerous Goods

(Contd. on page 12)
Product name: SM68 Standard 1: Al, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ho, In, K, La, Li, Lu, Mg, Mn, Na, Nd, Ni, P, Pb, Pr, Rb, Re, Sc, Se, Sm, Sr, Tb, Th, Tl, Tm, U, V, Y, Yb, Zn @ 100 µg/mL in 5% HNO3

DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NTPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Ox. Liq. 2: Oxidizing liquids – Category 2
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Dam. 1: Serious eye damage/eye irritation – Category 1

Sources

Data compared to the previous version altered. All sections have been updated.