1 Identification

- Product identifier
- Trade name: Custom Standard
- Part number: ICUS-4339
- Application of the substance / the mixture: Reagents and Standards for Analytical Chemical Laboratory Use
- Details of the supplier of the safety data sheet
  - Manufacturer/Supplier: Agilent Technologies, Inc.
    5301 Stevens Creek Blvd.
    Santa Clara, CA  95051  USA
  - Information department:
    Telephone: 800-227-9770
    e-mail: pdl-msds_author@agilent.com
  - Emergency telephone number: CHEMTREC®: 1-800-424-9300

2 Hazard(s) identification

- Classification of the substance or mixture
  - GHS05 Corrosion
    Eye Dam. 1  H318  Causes serious eye damage.
  - GHS07
    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).
  - Hazard pictograms
    - GHS05

- Signal word: Danger

- Hazard-determining components of labeling:
  - nitric acid

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

- Precautionary statements
  - Wash thoroughly after handling.
  - Wear protective gloves / eye protection / face protection.
  - If on skin: Wash with plenty of water.
  - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
  - Continue rinsing.
  - Immediately call a poison center/doctor.
  - Specific treatment (see on this label).
  - Take off contaminated clothing and wash it before reuse.

(Contd. on page 2)
47.0 If skin irritation occurs: Get medical advice/attention.

Classification system:
- NFPA ratings (scale 0 - 4)

  Health = 3
  Fire = 0
  Reactivity = 0

- HMIS-ratings (scale 0 - 4)

  HEALTH: Health = 3
  FIRE: Fire = 0
  REACTIVITY: 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: Mixture of the substances listed below with nonhazardous additions.

Dangerous components:

<table>
<thead>
<tr>
<th>Chemical ID</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>7697-37-2</td>
<td>4.95%</td>
</tr>
</tbody>
</table>

4 First-aid measures

- Description of first aid measures
  - After inhalation: In case of unconsciousness place patient stably in side position for transportation.
  - After skin contact: Immediately wash with water and soap and rinse thoroughly.
  - After eye contact: Rinse opened eye for several minutes under running water. Then consult a doctor.
  - After swallowing: If symptoms persist consult doctor.

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: Use fire fighting measures that suit the environment.
  - Special hazards arising from the substance or mixture: No further relevant information available.

- Advice for firefighters
- Protective equipment: No special measures required.

6 Accidental release measures

- Personal precautions, protective equipment and emergency procedures
  Wear protective equipment. Keep unprotected persons away.
Environmental precautions: Do not allow to enter sewers/ surface or ground water.

Methods and material for containment and cleaning up:
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralizing agent.
Dispose contaminated material as waste according to item 13.

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.

Protective Action Criteria for Chemicals

PAC-1:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>7697-37-2 nitric acid</td>
<td>0.16 ppm</td>
</tr>
<tr>
<td>7664-39-3 hydrogen fluoride</td>
<td>1.0 ppm</td>
</tr>
<tr>
<td>7782-61-8 iron (III) nitrate nonahydrate</td>
<td>22 mg/m³</td>
</tr>
<tr>
<td>7784-27-2 aluminium nitrate</td>
<td>83 mg/m³</td>
</tr>
<tr>
<td>7803-55-6 ammonium trioxovanadate</td>
<td>0.01 mg/m³</td>
</tr>
<tr>
<td>10377-66-9 manganese dinitrate</td>
<td>9.8 mg/m³</td>
</tr>
<tr>
<td>13478-00-7 Nitric acid, nickel(2+) salt, hexahydrate</td>
<td>1.5 mg/m³</td>
</tr>
<tr>
<td>10022-68-1 Nitric acid, cadmium salt, tetrahydrate</td>
<td>0.27 mg/m³</td>
</tr>
</tbody>
</table>

PAC-2:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>7697-37-2 nitric acid</td>
<td>24 ppm</td>
</tr>
<tr>
<td>7664-39-3 hydrogen fluoride</td>
<td>24 ppm</td>
</tr>
<tr>
<td>7782-61-8 iron (III) nitrate nonahydrate</td>
<td>110 mg/m³</td>
</tr>
<tr>
<td>7784-27-2 aluminium nitrate</td>
<td>920 mg/m³</td>
</tr>
<tr>
<td>7803-55-6 ammonium trioxovanadate</td>
<td>0.11 mg/m³</td>
</tr>
<tr>
<td>10377-66-9 manganese dinitrate</td>
<td>16 mg/m³</td>
</tr>
<tr>
<td>13478-00-7 Nitric acid, nickel(2+) salt, hexahydrate</td>
<td>53 mg/m³</td>
</tr>
<tr>
<td>10022-68-1 Nitric acid, cadmium salt, tetrahydrate</td>
<td>2.1 mg/m³</td>
</tr>
</tbody>
</table>

PAC-3:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>7697-37-2 nitric acid</td>
<td>92 ppm</td>
</tr>
<tr>
<td>7664-39-3 hydrogen fluoride</td>
<td>44 ppm</td>
</tr>
<tr>
<td>7782-61-8 iron (III) nitrate nonahydrate</td>
<td>640 mg/m³</td>
</tr>
<tr>
<td>7784-27-2 aluminium nitrate</td>
<td>5,500 mg/m³</td>
</tr>
<tr>
<td>7803-55-6 ammonium trioxovanadate</td>
<td>80 mg/m³</td>
</tr>
<tr>
<td>10377-66-9 manganese dinitrate</td>
<td>96 mg/m³</td>
</tr>
<tr>
<td>13478-00-7 Nitric acid, nickel(2+) salt, hexahydrate</td>
<td>320 mg/m³</td>
</tr>
<tr>
<td>10022-68-1 Nitric acid, cadmium salt, tetrahydrate</td>
<td>13 mg/m³</td>
</tr>
</tbody>
</table>

7 Handling and storage

Handling:

Precautions for safe handling: No special precautions are necessary if used correctly.

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: No special requirements.
8 Exposure controls/personal protection

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

- Control parameters

- Components with limit values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>Substance</th>
<th>PEL</th>
<th>REL Long-term value: 10 mg/m³, 4 ppm</th>
<th>Long-term value: 5 mg/m³, 2 ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>7697-37-2 nitric acid</td>
<td>Long-term value: 5 mg/m³, 2 ppm</td>
<td>Short-term value: 10 mg/m³, 4 ppm</td>
<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:
  When used as intended with Agilent instruments, the use of the product under normal laboratory conditions and with standard practices does not result in significant airborne exposures and therefore respiratory protection is not needed.
  Under an emergency condition where a respirator is deemed necessary, use a NIOSH or equivalent approved device/equipment with appropriate organic or acid gas cartridge.

- Protection of hands:
  Although not recommended for constant contact with the chemicals or for clean-up, nitrile gloves 11-13 mil thickness are recommended for normal use. The breakthrough time is 1 hr. For cleaning a spill where there is direct contact of the chemical, butyl rubber gloves are recommended 12-15 mil thickness with breakthrough times exceeding 4 hrs. Supplier recommendations should be followed.

- Material of gloves
  For normal use: nitrile rubber, 11-13 mil thickness
  For direct contact with the chemical: butyl rubber, 12-15 mil thickness

- Penetration time of glove material
  For normal use: nitrile rubber: 1 hour
  For direct contact with the chemical: butyl rubber: >4 hours

- Eye protection:

  Tightly sealed goggles
9 Physical and chemical properties

- Information on basic physical and chemical properties
- General Information
  - Appearance:
    - Form: Fluid
    - Color: According to product specification
  - Odor: Characteristic
  - Odor threshold: Not determined.
  - pH-value: Not determined.
- Change in condition
  - Melting point/Melting range: Undetermined.
  - Boiling point/Boiling range: 100 °C (212 °F)
- Flash point: Not applicable.
- Flammability (solid, gaseous): Not applicable.
- Decomposition temperature: Not determined.
- Auto igniting: Product is not self-igniting.
- Danger of explosion: Product does not present an explosion hazard.
- Explosion limits:
  - Lower: Not determined.
  - Upper: Not determined.
- Vapor pressure at 20 °C (68 °F): 23 hPa (17.3 mm Hg)
- Density: Not determined.
  - Relative density: Not determined.
  - Vapor density: Not determined.
  - Evaporation rate: Not determined.
- Solubility in / Miscibility with
  - Water: Not miscible or difficult to mix.
- Partition coefficient (n-octanol/water): Not determined.
- Viscosity:
  - Dynamic: Not determined.
  - Kinematic: Not determined.
- Solvent content:
  - Water: 94.9 %
  - VOC content: 0.00 %
  - 0.0 g/l / 0.00 lb/gl
- Solids content: 0.0 %
- Other information: No further relevant information available.

10 Stability and reactivity

- Reactivity: No further relevant information available.
- Chemical stability
- Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
- Possibility of hazardous reactions: No dangerous reactions known.

(Contd. on page 6)
11 Toxicological information

- Information on toxicological effects
  - Acute toxicity:
    - LD/LC50 values that are relevant for classification:
      - ATE (Acute Toxicity Estimate)
        | Route       | LD50/LC50 |
        |            |          |
        | Oral        | 1,276,000 mg/kg (rat) |
        | Dermal      | 5,000 mg/kg |
        | Inhalative  | 365 mg/L |
      - 7697-37-2 nitric acid
        | Inhalative  | LC50/4 h 67 mg/L (rat) |
      - 7664-39-3 hydrogen fluoride
        | Oral        | LD50 1,276 mg/kg (rat) |
      - 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: No sensitizing effects known.
      - Additional toxicological information:
        The product shows the following dangers according to internally approved calculation methods for preparations: Irritant
  - Carcinogenic categories
    - IARC (International Agency for Research on Cancer)
      | Substance                          | Classification |
      | 13478-00-7 Nitric acid, nickel(2+) salt, hexahydrate | 1 |
      | 10022-68-1 Nitric acid, cadmium salt, tetrahydrate | 1 |
    - NTP (National Toxicology Program)
      | Substance                          | Classification |
      | 13478-00-7 Nitric acid, nickel(2+) salt, hexahydrate | K |
      | 10022-68-1 Nitric acid, cadmium salt, tetrahydrate | K |
    - OSHA-Ca (Occupational Safety & Health Administration)
      None of the ingredients is listed.

12 Ecological information

- Toxicity
  - Aquatic toxicity: No further relevant information available.
  - 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 2 (Self-assessment): hazardous for water
      Do not allow product to reach ground water, water course or sewage system.
Trade name: Custom Standard

- Must not reach bodies of water or drainage ditch undiluted or unneutralized.
- Danger to drinking water if even small quantities leak into the ground.

**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.

- **Uncleaned packagings**
  - **Recommendation:** Disposal must be made according to official regulations.

### 14 Transport information

- **UN-Number**
  - DOT, IMDG, IATA: UN3264

- **UN proper shipping name**
  - DOT: 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

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

- **Packing group**
  - DOT, IMDG, IATA: II

- **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

(Contd. on page 8)
| Section 355 (extremely hazardous substances): |  |
| 7697-37-2 nitric acid |  |
| 7664-39-3 hydrogen fluoride |  |

| Section 313 (Specific toxic chemical listings): |  |
| 7697-37-2 nitric acid |  |
| 7664-39-3 hydrogen fluoride |  |
| 10031-43-3 cupric nitrate |  |
| 7782-61-8 iron (III) nitrate nonahydrate |  |
| 7784-27-2 aluminium nitrate |  |
| 7803-55-6 ammonium trioxovanadate |  |
| 7789-02-8 chromium (III) nitrate nonahydrate |  |
| 10377-66-9 manganese dinitrate |  |
| 13478-00-7 Nitric acid, nickel(2+) salt, hexahydrate |  |
| 10022-68-1 Nitric acid, cadmium salt, tetrahydrate |  |

| TSCA (Toxic Substances Control Act): |  |
| 7697-37-2 nitric acid |  |
| 7664-39-3 hydrogen fluoride |  |
| 7803-55-6 ammonium trioxovanadate |  |
| 10377-66-9 manganese dinitrate |  |
| 7732-18-5 water |  |

| Proposition 65 |  |
| Chemicals known to cause cancer: |  |
| 13478-00-7 Nitric acid, nickel(2+) salt, hexahydrate |  |
| 10022-68-1 Nitric acid, cadmium salt, tetrahydrate |  |
47.0

ꞏ Chemicals known to cause reproductive toxicity for females: None of the ingredients is listed.

ꞏ Chemicals known to cause reproductive toxicity for males: None of the ingredients is listed.

ꞏ Chemicals known to cause developmental toxicity: None of the ingredients is listed.

ꞏ Carcinogenic categories

ꞏ EPA (Environmental Protection Agency)
  10377-66-9 manganese dinitrate D

ꞏ TLV (Threshold Limit Value established by ACGIH) None of the ingredients is listed.

ꞏ NIOSH-Ca (National Institute for Occupational Safety and Health) None of the ingredients is listed.

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

ꞏ Hazard pictograms

GHS05

ꞏ Signal word Danger

ꞏ Hazard-determining components of labeling: nitric acid

ꞏ Hazard statements
  Causes skin irritation.
  Causes serious eye damage.

ꞏ Precautionary statements
  Wash thoroughly after handling.
  Wear protective gloves / eye protection / face protection.
  If on skin: Wash with plenty of water.
  If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  Immediately call a poison center/doctor.
  Specific treatment (see on this label).
  Take off contaminated clothing and wash it before reuse.
  If skin irritation occurs: Get medical advice/attention.

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

16 Other information

The information contained in this document is based on Agilent's state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.

ꞏ Date of preparation / last revision 08/02/2018 / -

ꞏ 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
  DOT: US Department of Transportation
  IATA: International Air Transport Association

(Contd. on page 10)
Trade name: Custom Standard

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)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
VOC: Volatile Organic Compounds (USA, EU)
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
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Dam. 1: Serious eye damage/eye irritation – Category 1