SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier
Mixture identification:
Trade name: Nitinol Alloys
Document number: RBSDSU080421

1.2. Relevant identified uses of the substance or mixture and uses advised against
Recommended use: shape memory alloy
Uses advised against: All uses not listed as recommended

1.3. Details of the supplier of the safety data sheet
Company: SAES Smart Materials, Inc.
4355 Middle Settlement Road
New Hartford - 13413 - NY – USA
Tel: +1 315 2662026 Fax: +1 315 2662027
Competent person responsible for the safety data sheet: sds@saes-group.com

1.4. Emergency telephone number
CHEMTREC PHONE
+1 (800) 424-9300 (US emergencies)
+1 (703) 527 3887 (international emergencies)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture
EC regulation criteria 1272/2008 (CLP)

⚠️ Warning, Skin Sens. 1, May cause an allergic skin reaction.

⚠️ Warning, Carc. 2, Suspected of causing cancer.

⚠️ Danger, STOT RE 1, Causes damage to organs through prolonged or repeated exposure.

Adverse physicochemical, human health and environmental effects:
No other hazards

2.2. Label elements
Hazard pictograms:

⚠️ Danger
Hazard statements:
Safety Data Sheet
Nitinol Alloys

H317 May cause an allergic skin reaction.  
H351 Suspected of causing cancer.  
H372 Causes damage to organs through prolonged or repeated exposure.  

Precautionary statements:  
P201 Obtain special instructions before use.  
P202 Do not handle until all safety precautions have been read and understood.  
P261 Avoid breathing dust or mist.  
P280 Wear protective gloves/clothing.  
P308+P313 IF exposed or concerned: Get medical advice/attention.  
P314 Get medical advice/attention if you feel unwell.  

Special Provisions:  
None

Contains Nitinol  

Special provisions according to Annex XVII of REACH and subsequent amendments:  
None

2.3. Other hazards  
vPvB Substances: None - PBT Substances: None

Other Hazards:  
No other hazards

This product may not require a label according to Article 17 of CLP (see section 1.3 of Annex I) (Table 3.1).

SECTION 3: Composition/information on ingredients  
3.1. Substances  
N.A.

3.2. Mixtures  
Hazardous components within the meaning of the CLP regulation and related classification:

<table>
<thead>
<tr>
<th>Qty</th>
<th>Name</th>
<th>Ident. Number</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;= 90%</td>
<td>Nitinol</td>
<td>CAS: 52013-44-2</td>
<td>❍ 3.4.2/1 Skin Sens. 1 H317</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EC: 610-765-8</td>
<td>❍ 3.6/2 Carc. 2 H351</td>
</tr>
<tr>
<td></td>
<td></td>
<td>REACH No.: 01-2120012527-64</td>
<td>❍ 3.9/1 STOT RE 1 H372</td>
</tr>
<tr>
<td>&lt; 5%</td>
<td>Chromium</td>
<td>CAS: 7440-47-3</td>
<td>Substance with a Union workplace exposure limit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EC: 231-157-5</td>
<td></td>
</tr>
</tbody>
</table>

SECTION 4: First aid measures  
4.1. Description of first aid measures  
In case of skin contact:  
Immediately take off all contaminated clothing.  
Areas of the body that have - or are only even suspected of having - come into contact with the product must be rinsed immediately with plenty of running water and possibly with soap. Wash thoroughly the body (shower or bath).  
Remove contaminated clothing immediately and dispose off safely.  

In case of eyes contact:  
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.  

In case of Ingestion:  
Do not under any circumstances induce vomiting. OBTAIN A MEDICAL EXAMINATION IMMEDIATELY.
In case of Inhalation:
Remove casualty to fresh air and keep warm and at rest.

4.2. Most important symptoms and effects, both acute and delayed
None

4.3. Indication of any immediate medical attention and special treatment needed
In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).
Treatment:
None

SECTION 5: Firefighting measures
5.1. Extinguishing media
Suitable extinguishing media:
Water.
Carbon dioxide (CO2).

Extinguishing media which must not be used for safety reasons:
None in particular.

5.2. Special hazards arising from the substance or mixture
Do not inhale explosion and combustion gases.
Burning produces heavy smoke.

5.3. Advice for firefighters
Use suitable breathing apparatus.
Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Move undamaged containers from immediate hazard area if it can be done safely.

SECTION 6: Accidental release measures
6.1. Personal precautions, protective equipment and emergency procedures
Wear personal protection equipment.
Remove persons to safety.
See protective measures under point 7 and 8.

6.2. Environmental precautions
Do not allow to enter into soil/subsoil. Do not allow to enter into surface water or drains.
Retain contaminated washing water and dispose it.
In case of gas escape or of entry into waterways, soil or drains, inform the responsible authorities.
Suitable material for taking up: absorbing material, organic, sand

6.3. Methods and material for containment and cleaning up
Clean up contaminate area and avoid creating dust.
Properly package all spill residue in an UN approved container

6.4. Reference to other sections
See also section 8 and 13

SECTION 7: Handling and storage
7.1. Precautions for safe handling
Avoid contact with skin and eyes, inhalation of vapours and mists.
Exercise the greatest care when handling or opening the container.
Don't use empty container before they have been cleaned.
Before making transfer operations, assure that there aren't any incompatible material residuals in the containers.
See also section 8 for recommended protective equipment.
Advice on general occupational hygiene:
Contaminated clothing should be changed before entering eating areas.
Do not eat or drink while working.
7.2. Conditions for safe storage, including any incompatibilities
   Keep away from food, drink and feed.
   Incompatible materials:
   None in particular.
   Instructions as regards storage premises:
   Adequately ventilated premises.

7.3. Specific end use(s)
   None in particular

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
   Chromium - CAS: 7440-47-3
   EU - TWA(8h): 2 mg/m3
   ACGIH - TWA(8h): 0.0002 mg/m3 - STEL: 0.0005 mg/m3 - Notes: Hexavalent chromium compounds, water soluble. (I), A1, Skin, DSEN, RSEN - Lung and sinonasal cancer, resp tract irr, asthma
   ACGIH - TWA(8h): 0.003 mg/m3 - Notes: Trivalent chromium compounds, water soluble. (I), A4, DSEN, RSEN - Resp tract irr, asthma
   ACGIH - TWA(8h): 0.5 mg/m3 - Notes: Metallic chromium. (I) - Resp tract irr

DNEL Exposure Limit Values
   N.A.

PNEC Exposure Limit Values
   N.A.

8.2. Exposure controls
   Eye protection:
   Use close fitting safety goggles, don't use eye lens.
   Protection for skin:
   Use clothing that provides comprehensive protection to the skin, e.g. cotton, rubber, PVC or viton.
   Protection for hands:
   Use protective gloves that provides comprehensive protection, e.g. P.V.C., neoprene or rubber.
   Respiratory protection:
   Not needed for normal use.
   Thermal Hazards:
   None

Environmental exposure controls:
   None

Appropriate engineering controls:
   None

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Properties</th>
<th>Value</th>
<th>Method</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>N.A.</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Odour</td>
<td>Not Relevant</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Odour threshold:</td>
<td>Not Relevant</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>pH:</td>
<td>Not Relevant</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Melting point / freezing point:</td>
<td>&gt;1000°C</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Initial boiling point and boiling range:</td>
<td>Not Relevant</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>
9.2. Other information

<table>
<thead>
<tr>
<th>Properties</th>
<th>Value</th>
<th>Method:</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miscibility:</td>
<td>Not Relevant</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Fat Solubility:</td>
<td>Not Relevant</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Conductivity:</td>
<td>Not Relevant</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Substance Groups relevant properties</td>
<td>Not Relevant</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

**SECTION 10: Stability and reactivity**

10.1. Reactivity
Stable under normal conditions

10.2. Chemical stability
Stable under normal conditions

10.3. Possibility of hazardous reactions
- It may generate flammable gases, on contact with mineral acids.
- It may catch fire on contact with mineral acids, azo, diazo and hydrazine compounds, halogenated organic substances, and powerful oxidising agents.

10.4. Conditions to avoid
Stable under normal conditions.

10.5. Incompatible materials
None in particular.

10.6. Hazardous decomposition products
None.

**SECTION 11: Toxicological information**

11.1. Information on toxicological effects
Toxicological information of the product:
N.A.

Toxicological information of the main substances found in the product:
N.A.

If not differently specified, the information required in Regulation (EU)2015/830 listed below must be considered as N.A.:

a) acute toxicity;
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Nitinol Alloys

b) skin corrosion/irritation;
c) serious eye damage/irritation;
d) respiratory or skin sensitisation;
e) germ cell mutagenicity;
f) carcinogenicity;
g) reproductive toxicity;
h) STOT-single exposure;
i) STOT-repeated exposure;
j) aspiration hazard.

SECTION 12: Ecological information
12.1. Toxicity
Adopt good working practices, so that the product is not released into the environment.
Chromium - CAS: 7440-47-3
a) Aquatic acute toxicity:
   Endpoint: LC50 - Species: Fish 14.3 mg/l - Duration h: 96 - Notes: Cyprinus carpio
   Endpoint: CL100 - Species: Fish 2.4 mg/l - Duration h: 168 - Notes: Pimephales promelas
   Endpoint: NOEC - Species: Fish 12 mg/l - Duration h: 168 - Notes: Pimephales promelas
   Endpoint: EC50 - Species: Daphnia 0.07 mg/l - Duration h: 48 - Notes: Daphnia magna

12.2. Persistence and degradability
N.A.
12.3. Bioaccumulative potential
N.A.
12.4. Mobility in soil
N.A.
12.5. Results of PBT and vPvB assessment
vPvB Substances: None - PBT Substances: None
12.6. Other adverse effects
None

SECTION 13: Disposal considerations
13.1. Waste treatment methods
Recover, if possible. Send to authorised Treatment, Storage, and Disposal Facility or for incineration under controlled conditions. In so doing, comply with the local and national regulations currently in force.
Clean empty containers before disposing.
Do not dispose in sewage water.

SECTION 14: Transport information

14.1. UN number
DOT Special Permit:
Not classified as dangerous in the meaning of transport regulations.
14.2. UN proper shipping name
N.A.
14.3. Transport hazard class(es)
N.A.
14.4. Packing group
N.A.
14.5. Environmental hazards
ADR-Environmental Pollutant: No
IMDG-Marine pollutant: No

14.6. Special precautions for user
N.A.

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code
N.A.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
Dir. 98/24/EC (Risks related to chemical agents at work)
Dir. 2000/39/EC (Occupational exposure limit values)
Regulation (EC) n. 1907/2006 (REACH)
Regulation (EC) n. 1272/2008 (CLP)
Regulation (EC) n. 790/2009 (ATP 1 CLP) and (EU) n. 758/2013
Regulation (EU) 2015/830
Regulation (EU) n. 286/2011 (ATP 2 CLP)
Regulation (EU) n. 618/2012 (ATP 3 CLP)
Regulation (EU) n. 487/2013 (ATP 4 CLP)
Regulation (EU) n. 944/2013 (ATP 5 CLP)
Regulation (EU) n. 605/2014 (ATP 6 CLP)
Regulation (EU) n. 2015/1221 (ATP 7 CLP)
Regulation (EU) n. 2016/918 (ATP 8 CLP)
Regulation (EU) n. 2016/1179 (ATP 9 CLP)
Regulation (EU) n. 2017/776 (ATP 10 CLP)
Regulation (EU) n. 2018/669 (ATP 11 CLP)
Regulation (EU) n. 2018/1480 (ATP 13 CLP)
Regulation (EU) n. 2019/521 (ATP 12 CLP)
Regulation (EU) n. 2020/217 (ATP 14 CLP)
Regulation (EU) n. 2020/1182 (ATP 15 CLP)
Regulation (EU) n. 2021/643 (ATP 16 CLP)

Restrictions related to the product or the substances contained according to Annex XVII Regulation (EC) 1907/2006 (REACH) and subsequent modifications:
Restrictions related to the product:
No restriction.
Restrictions related to the substances contained:
Restriction 75

Where applicable, refer to the following regulatory provisions:
Directive 2012/18/EU (Seveso III)
Dir. 2004/42/EC (VOC directive)

Provisions related to directive EU 2012/18 (Seveso III):
Seveso III category according to Annex 1, part 1
None

15.2. Chemical safety assessment
No Chemical Safety Assessment has been carried out for the mixture.

SECTION 16: Other information

Full text of phrases referred to in Section 3:
H317 May cause an allergic skin reaction.
H351 Suspected of causing cancer.
H372 Causes damage to organs through prolonged or repeated exposure.
### Hazard class and hazard category

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.4.2/1</td>
<td>Skin Sensitisation, Category 1</td>
</tr>
<tr>
<td>3.6/2</td>
<td>Carcinogenicity, Category 2</td>
</tr>
<tr>
<td>3.9/1</td>
<td>Specific target organ toxicity - repeated exposure, Category 1</td>
</tr>
</tbody>
</table>

### Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]:

<table>
<thead>
<tr>
<th>Classification according to Regulation (EC) Nr. 1272/2008</th>
<th>Classification procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin Sens. 1, H317</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Carc. 2, H351</td>
<td>Calculation method</td>
</tr>
<tr>
<td>STOT RE 1, H372</td>
<td>Calculation method</td>
</tr>
</tbody>
</table>

This document was prepared by a competent person who has received appropriate training.

Main bibliographic sources:
- ECDIN - Environmental Chemicals Data and Information Network - Joint Research Centre, Commission of the European Communities
- SAX's DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS - Eight Edition - Van Nostrand Reinhold

The information contained herein is based on our state of knowledge at the above-specified date. It refers solely to the product indicated and constitutes no guarantee of particular quality. It is the duty of the user to ensure that this information is appropriate and complete with respect to the specific use intended.

This MSDS cancels and replaces any preceding release.

**ADR:** European Agreement concerning the International Carriage of Dangerous Goods by Road.

**ATE:** Acute Toxicity Estimate

**ATEmix:** Acute toxicity Estimate (Mixtures)

**CAS:** Chemical Abstracts Service (division of the American Chemical Society).

**CLP:** Classification, Labeling, Packaging.

**DNEL:** Derived No Effect Level.

**EINECS:** European Inventory of Existing Commercial Chemical Substances.

**GefStoffVO:** Ordinance on Hazardous Substances, Germany.

**GHS:** Globally Harmonized System of Classification and Labeling of Chemicals.

**IATA:** International Air Transport Association.

**IATA-DGR:** Dangerous Goods Regulation by the "International Air Transport Association" (IATA).
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ICAO: International Civil Aviation Organization.
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO).
INCI: International Nomenclature of Cosmetic Ingredients.
KSt: Explosion coefficient.
LC50: Lethal concentration, for 50 percent of test population.
LD50: Lethal dose, for 50 percent of test population.
PNEC: Predicted No Effect Concentration.
RID: Regulation Concerning the International Transport of Dangerous Goods by Rail.
STEL: Short Term Exposure limit.
STOT: Specific Target Organ Toxicity.
TLV: Threshold Limiting Value.
TWA: Time-weighted average.
WGK: German Water Hazard Class.