SECTION 1: IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

1.1 Product Identifier
   Trade Name: Sandvik Formula 1 Pickling Paste
   Classification: N/A
   Product Type: Pickling of stainless steel and Ni-based alloys
   Product Identifiers: Sandvik Green Pickling Paste
   SDS Date: July 2017

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against
   Product Use: Surface Treatment for Welding Surfaces
   Uses Advised Against: Use only as indicated for welding operations

1.3 Details of the Supplier of the Substance or Mixture
   Manufacturer: Sandvik Materials Technology
               SE-811 81 Sandviken
               Sweden
   Telephone: +46 26 260000
   Email: wire-welding_products.smt@sandvik.com

1.4 Emergency Telephone Number
   Emergency Spill Information: +46 26 260000 (Sweden)
   Other Product Information: www.smt.sandvik.com

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the Substance or Mixture
   CLP/GHS Classification (1272/2008):
   Metal Corrosion Category 1 H290
   Acute Toxicity Category 3 H301
   Acute Toxicity Category 2 H310
   Acute Toxicity Category 3 H331
   Skin Corrosion Category 1B H314
   Eye Damage Category 1 H318

2.2 Label Elements
   Danger!

Contains: Nitric Acid, Hydrofluoric Acid
Hazard Phrases:
H290 May be corrosive to metals.
H301 Toxic if swallowed
H310 Fatal in contact with skin
H314 Causes severe skin burns and eye damage.
H331 Toxic if inhaled.

Precautionary Phrases:
P234 Keep only in original packaging.
P390 Absorb spillage to prevent material damage.
P260 Do not breathe vapor, mists or spray.
P262 Do not get in eyes, on skin, or on clothing.
P264 Wash thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves, protective clothing, eye protection and face protection.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor.
P330 Rinse mouth.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with soap and water.
P363 Wash contaminated clothing before reuse.
P310 Immediately call a POISON CENTER or doctor.
P301 + P334 Take off immediately all contaminated clothing and wash it before reuse.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P310 Immediately call a POISON CENTER or doctor.
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 or doctor.
P405 Store locked up.
P406 Store in corrosive resistant container with a corrosive resistant inner liner.
P501 Dispose of contents and container in accordance with local and national regulations.

2.3 Other Hazards: None

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No. / EINECS No. / REACH Reg. No.</th>
<th>% (w/w)</th>
<th>CLP/GHS Classification (1272/2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitric Acid</td>
<td>7697-37-2 / 231-714-2</td>
<td>15-20</td>
<td>Ox. Liq. 2 H272</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Met Corr. 1 H290</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Acute Tox. 3 H331</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Skin Corr. 1A H314</td>
</tr>
<tr>
<td>Hydrofluoric acid</td>
<td>7664-39-3 / 231-633-2</td>
<td>4-6</td>
<td>Acute Tox. 2 H330</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Acute Tox. 1 H310</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Acute Tox. 2 H300</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Skin Corr. 1A H314</td>
</tr>
</tbody>
</table>

See Section 16 for full text of GHS Classifications.
SECTION 4: FIRST AID MEASURES

4.1 Description of First Aid Measures

First Aid:

Eye contact: Immediately flush victim's eyes with large quantities of water for at least 30 minutes, while holding the eyelids apart. Get immediate medical attention. If available, immediately rinse the affected area with Hexafluorine®.

Skin contact: Immediately remove contaminated clothing and wash skin thoroughly with soap and water for at least 20 minutes. Get immediate medical attention. Launder clothing before re-use. (Discard contaminated shoes). If available, immediately rinse the affected area with Hexafluorine®.

Inhalation: Immediately remove victim to fresh air. If breathing is difficult, oxygen should be administered by qualified personnel. If breathing has stopped, administer artificial respiration. Get immediate medical attention.

Ingestion: Rinse mouth with water. Do NOT induce vomiting. If conscious, one glass of water to dilute. Never give anything by mouth to an unconscious or convulsing person. Get immediate medical attention.

See Section 11 for more detailed information on health effects.

4.2 Most Important symptoms and effects, both acute and delayed: Causes severe irritation and burns to eyes and skin. Skin damage can occur without noticeable pain. Can be absorbed through the skin in fatal amounts. Inhalation may cause severe respiratory irritation or burns with coughing or labored breathing. May cause lung damage. May be toxic if swallowed. May cause severe burn to the mouth, throat or stomach. Symptoms may be delayed.

4.3 Indication of any immediate medical attention and special treatment needed: Medical treatment is required for all incidents of contact or exposure.

Contact your Poison Center for the latest advice on treatment. For eye contact: Carefully evaluate for eye damage, exposure to dilute solutions may result in delayed symptoms of ocular damage. For skin contact: Decontamination of the contact area is of primary importance. Symptoms may be delayed for several hours. Specific treatment is controversial with no single treatment clearly superior. Hexafluorine®, topical calcium gluconate gel or magnesium oxide paste have been successful. Hexafluorine® applied immediately to the skin may remove excess chemical from the surface of the tissue before it has a chance to penetrate. Calcium gluconate infiltration may be considered in some cases. Systemic absorption may occur and may require treatment with parenteral calcium salts. For ingestion: Administer fluoride binding substance. Consider nasogastric or soft orogastric suction and lavage with 10% calcium gluconate if the ingestion is recent and spontaneous emesis has not occurred. Monitor and treat hypocalcemia and hypomagnesemia, parenterally as needed. Observe and evaluate patient for oral and GI burns. For inhalation: Monitor for respiratory distress. Respiratory symptoms may be delayed up to 24 hours.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing Media: This material is not combustible. Use any media that is suitable for the surrounding fire.

5.2 Special Hazards Arising from the Substance or Mixture

Unusual Fire and Explosion Hazards: At elevated temperatures containers may rupture due to pressure buildup. Contact with alkali metals may evolve flammable hydrogen gas.

Combustion Products: Combustion may produce hydrogen chloride and oxides of carbon and nitrogen.
5.3 Advice for Fire-Fighters: Self-contained breathing apparatus and protective clothing should be worn in fighting fires involving chemicals. Cool fire exposed container with water. Contain water used in firefighting from entering sewers or natural waterways.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, Protective Equipment and Emergency Procedures:
Wear appropriate protective clothing and equipment as described in Section 8 to prevent eye and skin contact. Wash thoroughly after handling.

6.2 Environmental Precautions:
Avoid release into the environment. Report spill as required by local and national regulations.

6.3 Methods and Material for Containment and Cleaning Up:
Evacuate spill area. Wear appropriate protective clothing and equipment to prevent contact. For small spills, neutralize with Sandvik Neutralization paste. Dike spill with an absorbent materials and prevent spill from entering sewers and waterways. Collect into appropriate containers for disposal. Wash spill area with water.

6.4 Reference to Other Sections:
Refer to Section 8 for personal protective equipment and Section 13 for disposal information.

SECTION 7: HANDLING and STORAGE

7.1 Precautions for Safe Handling:
Prevent eye and skin contact. Do not breathe vapors or mists. Do not eat, drink or smoke when using this product. Use only with adequate ventilation and appropriate protective clothing. Immediately remove contaminated clothing and other items for disposal. Wash thoroughly after handling. This product can cause severe burns, tissue damage and absorption of potentially fatal amounts without pain. Immediately decontaminate all contact areas and get medical attention.

Empty containers retain product residues. Follow all SDS precautions in handling empty containers.

Before use, read instruction manual. Use ventilating fan to remove fumes.

7.2 Conditions for Safe Storage, Including any Incompatibilities:
Protect containers from physical damage. Store in a cool, well-ventilated area away from alkalies and acids. Do not store in metal containers. Keep in original containers.

7.3 Specific end use(s):
Industrial uses: Surface Treatment for Welded Surfaces for Stainless Steel and Nickel Alloys
Professional uses: Surface Treatment for Welded Surfaces for Stainless Steel and Nickel Alloys
## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1 Control Parameters: Refer to country specific regulations for exposure limits not provided below.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>US ACGIH</th>
<th>German OEL</th>
<th>Brazil OEL</th>
<th>Swedish OEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TLV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitric Acid</td>
<td>2 ppm TWA</td>
<td>1 ppm STEL</td>
<td>None Established</td>
<td>2 ppm TWA, 5 ppm STEL</td>
</tr>
<tr>
<td></td>
<td>4 PPM STEL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrofluoric acid (as fluorides)</td>
<td>2.5 mg/m³ TWA</td>
<td>1 mg/m³ TWA (inhalable aerosol, 4 mg/m³ STEL (inhalable aerosol)</td>
<td>None Established</td>
<td>2 mg/m³ TWA</td>
</tr>
</tbody>
</table>

### Definitions

**OEL** – Occupation Exposure Limit - An occupational exposure limit is an upper limit on the acceptable concentration of a hazardous substance in the workplace. It is typically set by national authorities and enforced by legislation to protect occupational safety and health.

**IOELV** - Indicative Occupational Exposure Limit Values – An exposure limit established by the European Union under Article 3 of the Chemical Agents Directive (98/24/EC). Member states are required to consider IOELVs when establishing national occupational exposure limits.

**PEL** - Permissible Exposure Limit - OSHA (29CFR 1910) – An exposure limit that is published and enforced by OSHA as a legal standard.

**STEL** - Short Term Exposure Limit - OSHA (29CFR 1910) – A 15-minute time weighted average exposure which should not be exceeded at any time during a work day.

**TLV** - Threshold Limit Value – American Conference of Governmental Industrial Hygienists – Time weighted average (TWA) concentration for a normal 8-hour work day and a 40-hour work week to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

### 8.2 Exposure Controls:

#### Recommended Monitoring Procedures:
Collect on silica gel tubes and analyze by IC. Refer to professional industrial or occupational hygienist for sampling and analytical methods. Certain regulations require periodic monitoring.

#### Appropriate Engineering Controls:
Use with adequate general or local exhaust ventilation to minimize exposure levels. Refer to ANSI Z49.1 and other applicable regulations for additional information.

#### Personal Protective Measurers

**Eye/face Protection:** Wear chemical safety goggles and faceshield to prevent eye and face contact unless a full facepiece respirator is used. Do not wear contact lenses. Selection of eye ware must be in accordance with EN 166.

**Skin Protection:** Impervious apron, boots and other clothing are recommended if needed to prevent contact or if splashing is possible.
**Hands:** Neoprene or other impervious gloves are required to prevent skin contact. Select appropriate gloves in accordance with EN 374.

**Respiratory Protection:** If exposures limits are exceeded, wear an approved full facepiece particulate respirator, supplied air respirator (with escape bottle if required) or self-contained breathing apparatus may be required. Selection of respiratory protection depends on the contaminant type, form and concentration. Select in accordance with applicable regulations and good Industrial Hygiene practice.

**Other protection:** A safety shower and an eye wash wash facility should be available in the immediate work area.

---

**SECTION 9: PHYSICAL and CHEMICAL PROPERTIES**

9.1 Information on basic Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Colorless, highly viscous, gel-like fluid</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>0.036 ppm (hydrofluoric acid)</td>
</tr>
<tr>
<td>Melting/Freezing Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flash Point</td>
<td>Not flammable</td>
</tr>
<tr>
<td>Lower Flammability Limit</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Upper Flammability Limit</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor Density (Air=1)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Solubility</td>
<td>Fully soluble in water</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Oxidizing Properties</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Molecular Formula</td>
<td>Mixture</td>
</tr>
<tr>
<td>Odor</td>
<td>Pungent</td>
</tr>
<tr>
<td>pH</td>
<td>&lt;1.5</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>~110°C (230°F)</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Relative Density</td>
<td>1.2 @ 20°C</td>
</tr>
<tr>
<td>Octanol/Water Partition Coefficient</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Explosive Properties</td>
<td>None</td>
</tr>
<tr>
<td>Specific Gravity (H2O=1)</td>
<td>Not available</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>Mixture</td>
</tr>
</tbody>
</table>

9.2 Other Information: None

---

**SECTION 10: STABILITY and REACTIVITY**

10.1 Reactivity: Reacts with metals.

10.2 Chemical Stability: Stable.

10.3 Possibility of Hazardous Reactions: Reacts with metals to form flammable hydrogen gas. Reacts with bases to produce heat.

10.4 Conditions to Avoid: Heating or direct sunlight.

10.5 Incompatible Materials: Avoid contact with bases and metals.

10.6 Hazardous Decomposition Products: Decomposition may produce hydrogen chloride and oxides of carbon and nitrogen.

---

**SECTION 11: TOXICOLOGICAL INFORMATION**

11.1 Information on Toxicological Effects:

**Potential Health Effects:**

**Eye Contact:** Causes severe irritation or burns with redness, tearing and pain. Permanent damage including blindness may occur.
**Skin contact:** Contact may cause severe irritation or burns to the skin. Burns may not be immediately painful or visible. Diluted solutions can also produce severe burns, but without causing immediate pain. Sometimes pain may be felt several hours later when hydrofluoric acid has penetrated into underlying tissues. May be fatal absorbed through the skin with symptoms similar to those listed under ingestion.

**Inhalation:** Mist and vapors may cause burns to the respiratory with coughing and labored breathing. May cause fluoride poisoning with effects similar to those listed under “ingestion”. Symptoms may be delayed. Harmful if inhaled. Medical treatment is required for all incidents of contact or exposure.

**Ingestion:** Corrosive to the mucous membranes of the mouth, throat and stomach. May cause fluoride poisoning with symptoms including weakness, tremors, shallow breathing, spasms of the hands and feet, convulsions and coma. May cause central nervous system, kidney and cardiovascular (heart rhythm) effects. Respiratory paralysis may cause death.

**Chronic Toxicity:** Prolonged or repeated exposure to fluorides may cause mottling of teeth, damage to bones and fluorosis with symptoms including brittle bones, weight loss, anemia, calcified ligaments and joint stiffness.

**Acute toxicity:** No acute toxicity data available for the product. Calculated Acute Toxicity Estimate: Oral 86 mg/kg, Dermal 86 mg/kg, Inhalation: 0.83 mg/L/4 hr

**Ingredient Toxicity Values**
Nitric Acid: Inhalation rat LC50 >2.65 mg/kg/4 hr
Hydrofluoric Acid: Inhalation rat LC50 > 1300 ppm/30 minutes

**Skin corrosion/irritation:** Nitric acid and hydrofluoric acid are corrosive to rabbit skin. This product is corrosive to the skin.

**Eye damage/irritation:** Nitric acid and hydrofluoric acid are corrosive to rabbit eyes. This product is corrosive to the eyes.

**Respiratory Irritation:** No data available. This product is expected to cause respiratory irritation or corrosion to the lungs.

**Respiratory Sensitization:** None of the components are respiratory sensitizers.

**Skin Sensitization:** None of the components have been shown to cause skin sensitization in animals or humans.

**Germ Cell Mutagenicity:** None of the components have been shown to cause mutagenic activity.

**Carcinogenicity:** None of the components are listed as a carcinogen or suspected carcinogen by EU CLP.

**Reproductive Toxicity:** None of the components have been shown to cause reproductive or developmental toxicity.

**Specific Target Organ Toxicity:**

**Single Exposure:** No data available.

**Repeat Exposure:** No data available

**Aspiration Toxicity:** This product does not meet the criteria for aspiration toxicity.
SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity: No toxicity data available for the product.

Ingredient Aquatic Toxicity Values
Nitric Acid: 96 hr LC50 chinook 4,400 mg/L, 48 hr EC50 Ceriodaphnia dubia 4.4 mg/L
Hydrofluoric Acid: 96 hr LC50 fish 51 mg/L, 48 hr EC50 daphnia magna 97 mg/L

During use, the pickling paste will absorbed oxidized metals and contaminants from the welding process which may include Chromium VI, nickel, manganese and other toxic metals. It is the responsibility of the user to determine the chemical content of the waste generated and to ensure proper disposal in accordance with all local and national regulations.

12.2 Persistence and degradability: Biodegradation is not applicable to inorganic substances.

12.3 Bioaccumulative Potential: The fluorides from this product is expected to accumulate predominately in the exoskeleton of crustacea and in the skeleton of fish. Test show there was no accumulation in the edible tissues.

12.4 Mobility in Soil: No data available.

12.5 Results of PVT and vPvB assessment: Not required.

2.6 Other Adverse Effects: No data available.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods:
Dispose in accordance with local and national regulations. Prevent waste from contaminating the surrounding environment. Discard any product, residue, disposable container, or liner in an environmentally accepted manner, in full compliance with federal, state, and local regulations.

SECTION 14: TRANSPORTATION INFORMATION

<table>
<thead>
<tr>
<th>14.1 UN Number</th>
<th>14.2 UN Proper Shipping Name</th>
<th>14.3 Hazard Class(s)</th>
<th>14.4 Packing Group</th>
<th>14.5 Environmental Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>US DOT UN2922</td>
<td>Corrosive liquid, toxic, n.o.s. (hydrofluoric acid, nitric acid)</td>
<td>8 (6.1)</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>Canadian TDG UN2922</td>
<td>Corrosive liquid, toxic, n.o.s. (hydrofluoric acid, nitric acid)</td>
<td>8 (6.1)</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>EU ADR/RID UN2922</td>
<td>Corrosive liquid, toxic, n.o.s. (hydrofluoric acid, nitric acid)</td>
<td>8 (6.1)</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>IMDG UN2922</td>
<td>Corrosive liquid, toxic, n.o.s. (hydrofluoric acid, nitric acid)</td>
<td>8 (6.1)</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>IATA/ICAO UN2922</td>
<td>Corrosive liquid, toxic, n.o.s. (hydrofluoric acid, nitric acid)</td>
<td>8 (6.1)</td>
<td>II</td>
<td></td>
</tr>
</tbody>
</table>

14.6 Special Precautions for User: None

14.7 Transport in Bulk According to Annex III MARPOL 73/78 and the IBC Code: Not applicable – product is transported only in packaged form.

SECTION 15: REGULATORY INFORMATION

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture
EU Regulations:

**EU RoHS:** This product does not contain any chemical regulated under the EU RoHS regulations.

**EU SVHC:** This product does not contain substances identified as Substances of Very High Concern when sold.

### SECTION 16: OTHER INFORMATION

SDS Date of Preparation/Revision: July 2017
SDS Revision History: New SDS

**CLP/GHS Classification and H Phrases for Reference (See Section 3)**
- Met Corr 1 Corrosive to Metals Category 1
- Ox. Liq. 2 Oxidizing Liquid Category 2
- Acute Tox. 1 Acute Toxicity Category 1
- Acute Tox. 2 Acute Toxicity Category 2
- Acute Tox. 3 Acute Toxicity Category 3
- Skin Corr 1A Skin Corrosion Category 1A

- H272 May intensify fire: oxidizer.
- H290 May be corrosive to metals.
- H300 Fatal if swallowed.
- H310 Fatal in contact with skin.
- H314 Causes severe skin burns and eye damage.
- H330 Fatal if inhaled.
- H331 Toxic if inhaled

**DISCLAIMER:** This product is intended for use only by qualified individuals experienced and trained in welding safety. Conditions of use and suitability of the product for particular uses are beyond our control, and while the information herein is given in good faith, SANDVIK MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Nor does Sandvik assume any liability arising out of use of the product described herein. In no event shall Sandvik be liable for any special, incidental, or consequential damages in connection with this SDS.