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

- Date of compilation: 29.10.2009
- 1.1 Product identifier
  - Trade name: RATIONAL Boiler Descaler
  - Article number(s): 6006.0111
- 1.2 Relevant identified uses of the substance or mixture and uses advised against
  - No further relevant information available.
- Application of the substance / the preparation: Descaler
- Uses advised against SU21 Consumer uses: Private households / general public / consumers
- 1.3 Details of the supplier of the safety data sheet
  - Manufacturer / Supplier:
    - RATIONAL AG
    - Siegfried-Meister-Straße 1
    - 86899 Landsberg am Lech
    - Germany
  - E-mail address of the competent person responsible for the Safety Data Sheet:
    - reinigung@rational-online.com
  - Informing department: Product management
- 1.4 Emergency telephone number:
  - Giftnotruf München "Klinikum rechts der Isar"
  - Tel. +49 89 19 24 0

SECTION 2: Hazards identification

- 2.1 Classification of the substance or mixture
  - Classification according to Regulation (EC) No 1272/2008
    - GHS05 corrosion
      - Met. Corr. 1  H290 May be corrosive to metals.
      - Skin Corr. 1B  H314 Causes severe skin burns and eye damage.
      - Eye Dam. 1  H318 Causes serious eye damage.
    - GHS07
      - STOT SE 3  H335 May cause respiratory irritation.
- 2.2 Label elements
  - Labelling according to Regulation (EC) No 1272/2008
    - The product is classified and labelled according to the CLP regulation.
  - Hazard pictograms
    - GHS05  GHS07
- Signal word Danger
- Hazard-determining components of labelling:
  - Hydrochloric acid
Trade name: RATIONAL Boiler Descaler

- **Hazard statements**
  - H290 May be corrosive to metals.
  - H314 Causes severe skin burns and eye damage.
  - H335 May cause respiratory irritation.

- **Precautionary statements**
  - P101 If medical advice is needed, have product container or label at hand.
  - P102 Keep out of reach of children.
  - P103 Read label before use.
  - P260 Do not breathe mist/vapours/spray.
  - P280 Wear protective gloves/protective clothing/eye protection/face protection.
  - P301+P330+P311 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
  - P303+P361+P331 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
  - P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
  - 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.
  - P405 Store locked up.

- **Additional information:**
  - EUH208 Contains But-2-ynediol. May produce an allergic reaction.

- **2.3 Other hazards**
  - Results of PBT and vPvB assessment
  - PBT: Not applicable.
  - vPvB: Not applicable.

### SECTION 3: Composition/information on ingredients

- **3.2 Chemical characterisation: Mixtures**
  - **Description:** Aqueous solution

<table>
<thead>
<tr>
<th>Dangerous components:</th>
<th>CAS: 7647-01-0</th>
<th>Hydrochloric acid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EINECS: 231-595-7</td>
<td>Met. Corr. 1, H290; Skin Corr. 1B, H314; Acute Tox. 4, H302; STOT SE 3, H335</td>
</tr>
<tr>
<td></td>
<td>Index number: 017-002-01-X</td>
<td>10-&lt;25%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAS: 110-65-6</th>
<th>But-2-ynediol</th>
</tr>
</thead>
<tbody>
<tr>
<td>EINECS: 203-788-6</td>
<td>Acute Tox. 3, H301; Acute Tox. 3, H311; Acute Tox. 3, H331; STOT RE 2, H373; Skin Corr. 1B, H314; Skin Sens. 1, H317</td>
</tr>
<tr>
<td>Index number: 603-076-00-9</td>
<td>≤ 2.5%</td>
</tr>
</tbody>
</table>

- **Additional information:** For the wording of the listed hazard phrases refer to section 16.

<table>
<thead>
<tr>
<th>Ingredients according to Regulation (EC) No 648/2004:</th>
</tr>
</thead>
<tbody>
<tr>
<td>anionic surfactants</td>
</tr>
</tbody>
</table>

### SECTION 4: First aid measures

- **4.1 Description of first aid measures**
  - **General information:** Immediately remove any clothing contaminated by the product.
  - **After inhalation:**
    - Supply fresh air; consult doctor in case of symptoms.
    - In case of unconsciousness bring patient into stable side position for transport.
  - **After skin contact:**
    - Instantly 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.
    - Remove contact lenses, if present and easy to do.
Trade name: RATIONAL Boiler Descaler

(Contd. of page 2)

- **Use eye protection.**
- **Call a doctor immediately.**
- **After swallowing:**
  - Drink copious amounts of water and provide fresh air. Instantly call for doctor.
  - Do not induce vomiting - Danger of perforation!
- **4.2 Most important symptoms and effects, both acute and delayed**
  - No further relevant information available.
- **4.3 Indication of any immediate medical attention and special treatment needed**
  - No further relevant information available.

SECTION 5: Firefighting measures

- **5.1 Extinguishing media**
- **Suitable extinguishing agents** Use fire fighting measures that suit the environment.
- **For safety reasons unsuitable extinguishing agents** none
- **5.2 Special hazards arising from the substance or mixture**
  - Can be released in case of fire:
    - Hydrogen chloride (HCl)
- **5.3 Advice for firefighters**
  - **Protective equipment:** Wear self-contained breathing apparatus.
  - **Additional information**
    - Dispose of fire debris and contaminated fire fighting water in accordance with official regulations.

SECTION 6: Accidental release measures

- **6.1 Personal precautions, protective equipment and emergency procedures**
  - Wear protective equipment. Keep unprotected persons away.
  - Ensure adequate ventilation.
  - Avoid contact with skin and eyes.
  - Use breathing protection against the effects of fumes/dust/aerosol.
- **6.2 Environmental precautions:**
  - Do not allow to enter drainage system, surface or ground water.
  - Dilute with much water.
- **6.3 Methods and material for containment and cleaning up:**
  - Ensure adequate ventilation.
  - Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  - Use neutralising agent.
  - Send for recovery or disposal in suitable containers.
  - Dispose of the material collected according to regulations.
- **6.4 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 information on disposal.

SECTION 7: Handling and storage

- **7.1 Precautions for safe handling**
  - Ensure good ventilation/exhaustion at the workplace.
  - Avoid contact with skin and eyes.
  - Avoid breathing vapours.
  - Keep containers tightly sealed.
  - Make sure that all applicable workplace limits are observed.
- **Information about protection against explosions and fires:** No special measures required.

(Contd. on page 4)
Trade name: RATIONAL Boiler Descaler

7.2 Conditions for safe storage, including any incompatibilities

- Storage
  - Requirements to be met by storerooms and containers:
    Store in the original container.
    Observe all local and national regulations for storage of water polluting products.
  - Information about storage in one common storage facility: Store away from foodstuffs.
  - Further information about storage conditions:
    Store in cool, dry conditions in well sealed containers.
    Store in a locked cabinet and out of the reach of children.
    Store and transport upright.

7.3 Specific end use(s) No further relevant information available.

SECTION 8: Exposure controls/personal protection

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

8.1 Control parameters

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

<table>
<thead>
<tr>
<th>Substance</th>
<th>WEL (Great Britain)</th>
<th>IOELV (European Union)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7647-01-0 Hydrochloric acid</td>
<td>Short-term value: 8 mg/m³, 5 ppm</td>
<td>Long-term value: 2 mg/m³, 1 ppm (gas and aerosol mists)</td>
</tr>
<tr>
<td></td>
<td>Short-term value: 15 mg/m³, 10 ppm</td>
<td>Long-term value: 8 mg/m³, 5 ppm</td>
</tr>
<tr>
<td>110-65-6 But-2-yne-1,4-diol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WEL (Great Britain)</td>
<td>Long-term value: 0.5 mg/m³</td>
<td></td>
</tr>
<tr>
<td>IOELV (European Union)</td>
<td>Long-term value: 0.5 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

- Additional information: The lists that were valid during the compilation were used as basis.

8.2 Exposure controls

- Personal protective equipment
  - General protective and hygienic measures
    Keep away from foodstuffs, beverages and food.
    Instantly remove any contaminated garments.
    Wash hands during breaks and at the end of the work.
    Use skin protection cream for preventive skin protection.
    Do not inhale gases / fumes / aerosols.
    Avoid contact with the eyes and skin.
    Do not eat, drink or smoke while working.

- Breathing equipment:
  Use breathing protection in case of insufficient ventilation.
  If all workplace limits are observed and good ventilation is ensured, no special precautions necessary.

- Recommended filter device for short term use: Combination filter ABEK-P2

- Protection of hands:
  Protective gloves
  To avoid skin problems reduce the wearing of gloves to the required minimum.
  Check the permeability prior to each renewed use of the glove.
  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.

- Material of gloves
  e.g. KCL Dermatril® 740

(Contd. on page 5)
Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 20.11.2018 Version number 2 Revision: 20.11.2018

Trade name: RATIONAL Boiler Descaler

Recommended thickness of the material: ≥ 0.11 mm
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

- **Penetration time of glove material**
  Penetration time: ≥ 1 hours
  The exact breakthrough time has to be found out by the manufacturer of the protective gloves and has to be observed.

- **Eye protection**: Tightly sealed safety glasses

- **Body protection**:
  Protective work clothing
  Body protection must be chosen depending on activity and possible exposure.

SECTION 9: Physical and chemical properties

- **9.1 Information on basic physical and chemical properties**

  - **General Information**

  - **Appearance:**
    Form: liquid
    Colour: light brown
    Smell: characteristic
    Odour threshold: not determined

  - **pH-value at 20 °C:** < 1

  - **Change in condition**
    Melting point/freezing point: not determined
    Initial boiling point and boiling range: > 100 °C

  - **Flash point:** not applicable

  - **Inflammability (solid, gaseous)** Not applicable.

  - **Decomposition temperature:** Not determined.

  - **Self-inflammability:**
    Product is not selfigniting.

  - **Explosive properties:**
    Product is not explosive.

  - **Critical values for explosion:**
    Lower: Not determined.
    Upper: Not determined.

  - **Oxidising properties**
    not classified as oxidising

  - **Vapor pressure at 20 °C:** 20 hPa

  - **Density at 20 °C:** 1.092 g/cm³
  - **Relative density** Not determined.
  - **Vapour density (AIR = 1):** Not determined.
  - **Evaporation rate** Not determined.

  - **Solubility in / Miscibility with**
    Water: fully miscible

  - **Partition coefficient: n-octanol/water:** Not determined.

  - **Viscosity:**
    dynamic: not determined
    kinematic: not determined

  - **Organic solvents:** 0 %

(Contd. on page 6)
SECTION 10: Stability and reactivity

- **10.1 Reactivity**
  No further relevant information available.

- **10.2 Chemical stability**
  - **Thermal decomposition / conditions to be avoided:**
    No decomposition if used according to specifications.
  - **10.3 Possibility of hazardous reactions**
    Corrosive action on metals
  - **10.4 Conditions to avoid**
    No further relevant information available.
  - **10.5 Incompatible materials:**
    No further relevant information available.
  - **10.6 Hazardous decomposition products:**
    Hydrogen chloride (HCl)

SECTION 11: Toxicological information

- **11.1 Information on toxicological effects**
  - **Acute toxicity**
    Based on available data, the classification criteria are not met.
  - **LD/LC50 values that are relevant for classification:**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Oral LD50</th>
<th>Inhalative LC50/1 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>7647-01-0 Hydrochloric acid</td>
<td>900 mg/kg (rabbit)</td>
<td>3.124 - 4.74 mg/l (rat) (RTECS)</td>
</tr>
<tr>
<td>110-65-6 But-2-yne-1,4-diol</td>
<td>104 mg/kg (rat)</td>
<td>659 mg/kg (rat) (OECD Guideline 402)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.69 mg/l (rat) (OECD Guideline 403)</td>
</tr>
</tbody>
</table>

- **Primary irritant effect:**
  - **Skin corrosion/irritation**
    Causes severe skin burns and eye damage.
  - **Serious eye damage/irritation**
    Causes serious eye damage.
  - **Inhalation:**
    May cause respiratory irritation.
  - **Respiratory or skin sensitisation**
    Based on available data, the classification criteria are not met.

- **Subacute to chronic toxicity:**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Oral NOAEL</th>
<th>LOAEL</th>
<th>Inhalative NOAEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>110-65-6 But-2-yne-1,4-diol</td>
<td>1 mg/kg/d (rat) (OECD Guideline 407)</td>
<td>10 mg/kg/d (rat) (OECD Guideline 407)</td>
<td>1 mg/kg/d (rat) (OECD Guideline 415)</td>
</tr>
</tbody>
</table>

- **Additional toxicological information:**
  The product shows the following dangers according to the calculation method of Regulation (EC) No. 1272/2008 (CLP/GHS):
  - **Skin Corr.** 1B
  - **Eye Dam.** 1
  - **STOT SE 3**
  - **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
    According to present knowledge no CMR-effects known.
  - **Germ cell mutagenicity**
    Based on available data, the classification criteria are not met.
  - **Carcinogenicity**
    Based on available data, the classification criteria are not met.
  - **Reproductive toxicity**
    Based on available data, the classification criteria are not met.
SECTION 12: Ecological information

12.1 Toxicity

Aquatic toxicity:

<table>
<thead>
<tr>
<th>Substance</th>
<th>EC50/48 h</th>
<th>LC50/96 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>7647-01-0 Hydrochloric acid</td>
<td>282 mg/l</td>
<td>862 mg/l</td>
</tr>
<tr>
<td>EC50/72 h</td>
<td>56 mg/l</td>
<td></td>
</tr>
<tr>
<td>LC50/48 h</td>
<td>862 mg/l</td>
<td></td>
</tr>
<tr>
<td>110-65-6 But-2-yn-1,4-diol</td>
<td></td>
<td>3940 mg/l</td>
</tr>
<tr>
<td>EC50/17 h</td>
<td></td>
<td>346 mg/l</td>
</tr>
<tr>
<td>LC50/96 h</td>
<td></td>
<td>53.6 mg/l</td>
</tr>
<tr>
<td>EC50/48 h</td>
<td>26.8 mg/l</td>
<td></td>
</tr>
</tbody>
</table>

12.2 Persistence and degradability

No further relevant information available.

12.3 Bioaccumulative potential

No further relevant information available.

12.4 Mobility in soil

No further relevant information available.

Additional ecological information:

General notes:

Must not reach sewage water or drainage ditch undiluted or unneutralised. Rinse off of bigger amounts into drains or the aquatic environment may lead to decreased pH-values. A low pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably increased, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.

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

12.5 Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

12.6 Other adverse effects

No further relevant information available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Recommendation

Must not be disposed of together with household garbage. Do not allow product to reach sewage system. Disposal must be made according to official regulations.

European waste catalogue:

Waste disposal key numbers from EWC have to be assigned depending on origin and processing.

Uncleaned packagings:

Recommendation: Disposal must be made according to official regulations.

Recommended cleaning agent: Water, if necessary with cleaning agent.
### SECTION 14: Transport information

<table>
<thead>
<tr>
<th>14.1 UN-Number</th>
<th>UN1789</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.2 UN proper shipping name</td>
<td>UN 1789 HYDROCHLORIC ACID, MIXTURE HYDROCHLORIC ACID MIXTURE</td>
</tr>
<tr>
<td>14.3 Transport hazard class(es)</td>
<td>ADR Class 8 (C1) Corrosive substances. Label 8, IMDG, IATA Class 8 Corrosive substances. Label 8</td>
</tr>
<tr>
<td>14.4 Packing group</td>
<td>ADR, IMDG, IATA II</td>
</tr>
<tr>
<td>14.5 Environmental hazards:</td>
<td>Marine pollutant: NO</td>
</tr>
<tr>
<td>14.6 Special precautions for user</td>
<td>Warning: Corrosive substances. Kemler Number: 80 EMS Number: F-A,S-B Segregation groups Acids Stowage Category E</td>
</tr>
<tr>
<td>14.7 Transport in bulk according to Annex II of Marpol and the IBC Code</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

**Transport/Additional information:**

<table>
<thead>
<tr>
<th>ADR</th>
<th>Limited quantities (LQ): 1L, Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Transport category: 2, Tunnel restriction code: E</td>
</tr>
<tr>
<td>IMDG</td>
<td>Limited quantities (LQ): 1L, Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml</td>
</tr>
</tbody>
</table>

**UN "Model Regulation":** UN1789, HYDROCHLORIC ACID, MIXTURE, 8, II
SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
REGULATION (EC) No 1907/2006 ANNEX XVII Conditions of restriction: 3
National regulations

Information about limitation of use:
Employment restrictions concerning young persons must be observed.

Decree to be applied in case of technical fault: Directive 2012/18/EU does not apply.

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

Other regulations, limitations and prohibitive regulations
Observe restrictions on the marketing and use according to Annex XVII of Regulation (EC) No 1907/2006.

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

SECTION 16: Other information

These data are based on our present knowledge. However, they shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Reasons for changes:
The Material Safety Data Sheet has been revised. Changes in the respective chapters are characterized in the left side edge by *.

Relevant phrases
The(se) H-phrase(s) are those of the ingredient(s) and do(es) not necessarily represent the classification of the product.
H290 May be corrosive to metals.
H301 Toxic if swallowed.
H302 Harmful if swallowed.
H311 Toxic in contact with skin.
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H331 Toxic if inhaled.
H335 May cause respiratory irritation.
H373 May cause damage to organs through prolonged or repeated exposure.

Department issuing SDS:
C.S.B. GmbH                  Phone: +49 - 2151 - 652086-0
Düsseldorfer Str. 113        Fax:   +49 - 2151 - 652086-9
47809 Krefeld / Germany

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
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
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)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Met. Corr. 1: Corrosive to metals – Category 1
Acute Tox. 3: Acute toxicity – Category 3
Acute Tox. 4: Acute toxicity – Category 4
Skin Corr. 1B: Skin corrosion/irritation – Category 1B
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Skin Sens. 1: Skin sensitisation – Category 1
Trade name: RATIONAL Boiler Descaler

- STOT SE 3: Specific target organ toxicity (single exposure) – Category 3
- STOT RE 2: Specific target organ toxicity (repeated exposure) – Category 2

* Data compared to the previous version altered.