Material safety data sheet
according to 1907/2006/EG, article 31

Date of printout: 26.04.2016 *Issue date: 16.01.2016*

1. Identification of the substance/mixture and of the company

- ***1.1 Product identifier***
- ***Product name: BRIGON CO2 refill liquid***
- ***Product code: 4191 (70m1 bottle) and 4192 (500m1 bottle)***
- ***1.2 Application areas for the substance or solution, as well as application areas not to be advised of***
  No data available
- ***Identified uses*** *In mechanical flue gas equipment to determine CO2 concentration in flue gas of heating boilers/burners*
- ***1.3 Details of the supplier/manufacturer, who provides this material safety data sheet***
- ***Manufacturer:***

  BRIGON Messtechnik GmbH
  Kronberger St. 11
  D-63110 Rodgau
  Tel. +49 6106 8207-0

- ***1.4 Emergency telephone number:***
  Helpdesk for toxicological inquiries in Mainz, Germany
  Tel. +49 61 31 / 19 240

2. Hazards identification

- ***2.1 Classification of the substance or mixture (CLP classification)***
- ***Classification according to EU Directive (EC) no. 1272/2008***

  Met. Corr.1 H290 May be corrosive to metals
  Skin Corr. 1A H314 Causes severe skin burns and eye damage
  Eye Dam. 1 H318 Causes serious eye damage
  Acute Tox. 4 H302 Harmful if swallowed

- ***2.2 Label elements***
- ***Labelling according to Regulation (EC) no. 1272/2008***
- *The product is classified and labeled in accordance with CLP Regulation.*
- ***Pictograms:***

GHS05 GHS07

- ***Signal word Danger***
- ***Hazardous ingredients for labeling:***
  Potassium hydroxide
- ***Hazard statements***
  H290 May be corrosive to metals
  H302 Harmful if swallowed
  H314 Causes severe skin burns and eye damage
- ***Precautionary statements***
  P260 Do not breath dust/fume/gas/mist/vapors/spray
  P280 Wear protective gloves/clothing/eye protection/face protection
  P301+P330+P331 IF SWALLOWED: Rinse mouth. Do not induce vomiting
  P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water /shower
  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
  P406 Store in corrosive resistant container with a resistant inner liner.
  P501 Dispose of content/container according to local/ regional/ national/ international regulations

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- ***2.3 Other hazard information***
- ***Results of PBT and vPvB assessment***
- ***PBT:*** *Not applicable*
- ***vPvB:*** *Not applicable*

3. Information on the ingredients

- ***3.2 Mixtures***
- ***Description:*** *Mixture of below mentioned substance with nonhazardous additives.*

- ***Hazardous ingredients:***

CAS: 1310-58-3 EINECS: 215-181-3 Reg.no: 01-2119487136-33	Potassium hydroxide Met. Corr.1, H290; Skin Corr. 1A, H314; Acute Tox. 4, H302	10-25%

4. First aid measures

- ***4.1 Description of first aid measures***
- ***General advice:***
  Immediately remove any clothing soiled by the product.
  Do not leave affected persons unattended.
  Self protection for the first aider (body protection, eye protection and respiratory protection)
- ***If inhaled:***
  Remove from exposure. Supply fresh air. Get qualified medical help. In case of breathing arrest or breathing anomalies give artificial respiration and immediately call a doctor/ emergency. In case of unconsciousness place the affected person in the recovery position.
- ***In case of skin contact:*** *Wash with water and soap and rinse thoroughly. Immediate qualified medical help is necessary , as untreated caustic burns prevent wounds from healing.*
- ***In case of eye contact:***
  Rinse opened eye for several minutes under running water and consult a doctor immediately.
- ***If swallowed:*** *Rinse out mouth with water and drink plenty of water, get qualified medical attention. Do not induce vomiting.*
- ***4.2 Most important symptoms and effects, both acute and delayed***
  Greasy body skin, burning and painful eyes, as well as skin. Shortage of breath. By swallowing severe pain in alimentary tract. State of shock.
- ***Indications for the doctor:***
  If splashes get into the eyes, immediately rinse the eyes with plenty of water and consult ophthalmologist.
  Treatment of chemical burns. Shock management. Pain relief. Antibiotics prophylaxis.
  Cave Glottis oedema, which development might occur with delay.
  If fume or mist is inhaled: breath in dexamethason spray (Auxiloson) until pain/ discomfort suspends.
- ***Danger/ risks***
  The solution causes severe far-reaching caustic burns on the wetted parts of the body. Especially eyes are put at risk. The risk of blindness exists. Inhaling of fumes or mist causes severe caustic burns of the respiratory system. Ingestion through the mouth can cause extensive destruction of the alimentary tract.
- ***4.3 Indication of immediate medical attention and special treatment needed : no further data available***

5. Fire fighting measures

- ***5.1 Suitable extinguishing media***
- ***Extinguishing media:***
  Use fire extinguishing methods suitable for surrounding conditions.
  CO2, fire extinguishing powder or water spray. In case of large fire use water spray or alcohol-resistant foam.
- ***5.2 Special hazards arising from the substance or mixture***
  Spilled substance reacts with base metals, like aluminium, lead, zinc, magnesium, and results in formation of hydrogen gas. Solution can have strong caustic effect on skin and eyes by contact.
- ***5.3 Special protective actions for fire-fighters***
  Wear protective overall and self-contained breathing apparatus.

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6: Accidental release of material

- **6.1 Personal precautions, protective equipment and emergency procedures**

  Wear protective clothing, keep unprotected persons away from the working area.
  If vapors arise wear protective overall and self-contained breathing apparatus.

- **6.2 Environmental precautions:**
  Prevent from penetrating sewage/surface water /ground water. By accidental release into the environment dilute with plenty of water. By release of big volumes of the product into the environment contact local authorities.

- **6.3 Methods and material for containment and cleaning up:**
  Absorb with liquid-binding materials (sand, diatomite, acid binders, universal binders, sawdust, etc.) Use neutralising substances. Dispose of contaminated material as waste according to item 13.

- **6.4 Cross reference to other sections of the MSDS**
  Information on handling and storage see Section 7.
  Information on personal protective equipment see Section 8.
  Information on disposal see Section 13.

7: Handling and Storage

- **7.1 Precautions for safe handling**
  Keep containers sealed.
  By diluting the substance add it to water supply.
  Avoid eye and skin contact.
  Do not expose the substance to contact with base metals, such as aluminium, magnesium, zinc or lead (hydrogen development). Never mix with acids.

- **Fire and explosion precautions:** no particular measures are necessary, as the product is not combustible.

- **7.2 Conditions for safe storage, including any incompatibilities**

- **Storage:** Store in a cool, dry place, using tightly sealed containers.

- **Requirement for storage areas and containers:**
  Consult legislative regulations on storage and usage of substances harmful to water. Do not store in aluminium, zinc, tin and other alloyed containers.

- **Incompatible storage conditions:** Do not store together with acids.

- **Additional information on storage conditions:** Protect from frost.
- **Storage class:**
  8 B Non combustible caustic hazardous substances (TRGS 510, storage of hazardous substances in portable containers)

8: Exposure controls and personal protection equipment

- **8.1 Control parameters**
- **Components with exposure control limits:**

• **DNEL limits**		
1310-58-3 Potassium hydroxide		
Inhalation	DNEL (worker)	1 mg/m³ (Long-term - local effects)

- **8.2 Exposure controls**

- **Personal protective equipment:**

- **General protective and hygienic measures:** Keep away from foodstuff, beverages and feeds. Remove soiled and contaminated clothing immediately. Wash hands before breaks and at the end of work. Avoid contact with eyes and skin. Do not breath in vapors.

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- ***Respiratory protection:*** *Wear suitable respiratory protective device if vapor/mist is formed.*
- ***Recommended device for short term protection:*** *Particle filter P2*
- ***Hands protection:*** *Alkaline resistant gloves (EN 374)*
- ***Gloves material***
  Butyl rubber
  Nitrile rubber
  Appropriate gloves are to be selected not only out of material quality reasons, but also reviewing other quality characteristics, which vary from manufacturer to manufacturer.
  Gloves must be CE-conform.
- ***Penetration time of gloves material***
  The exact penetration time of gloves material must be provided by the manufacturer.
- ***Eyes protection:*** *Sealed safety goggles.*
- ***Body protection:*** *Standard protective clothing. Safety shoes or boots resistant to chemicals. In case of possible skin contact wear impervious protective clothing.*

9: Physical and chemical properties

- ***9.1 Information on basic physical and chemical properties***
- ***General information***
- ***Visual nature:***

Form:	*liquid*
Color:	*red*
Odour:	*odorless*
Odour threshold:	*no data available*

PH-value (100 g/l) at 20 °C:	***> 14***

- ***Change of physical condition***

Melting point:	*No data available*
Boiling point:	*No data available*

Flash point:	*Not applicable; product is not flammable or explosive*

Vapor pressure:	*No data available*

Density at 20 °C:	*1,201 g/cm3*
Relative density	*No data available*
Vapor density	*No data available*
Evaporation rate	*No data available*

Solubility in water	*complete*

Partition coefficient (n-OctanoUWater):	*No data available*

- ***Viscosity:***

dynamic:	*No data available*
kinematic:	*No data available*

- ***9.2 Other data*** *No further information available*

10: Stability and Reactivity

- ***10.1 Reactivity***
- ***10.2 Chemical stability***
- ***Thermal decomposition /conditions to avoid:*** *Stable under recommended storage conditions.*
- ***10.3 Possibility of hazardous reactions***
  Reacts with base metals by forming of hydrogen. Exothermic reactions with acids.
- ***10.4 Conditions to avoid*** *No further information available.*
- ***10.5 Incompatible materials:*** *Light metals, acids, sal ammoniac.*
- ***10.6 Hazardous decomposition products:*** *Reacts with base metals by forming of hydrogen*
- ***Other data:***
  Solution reacts with carbon dioxide in the air by forming of potassium carbonate or hydrogen carbonate.

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11: Toxicology

- ***11.1 Information on toxicological effects***
- ***Acute toxicity:***

• ***LD/LC50 limits***		
1310-58-3 Potassium hydroxide		
Oral	*LD50*	*273 mg/kg (rat)*

- ***Primary irritation effects:***
- ***on skin:*** *strong caustic effect on skin and mucosas.*
- ***on eye:*** *strong caustic effect. Danger of blindness*
- ***Sensitization:*** *no sensitising effects known.*

- ***Other information (experimental toxicology):***
  Toxicological numerical data relate to 100% undiluted substance.
- ***Subacute to chronic toxicity:***
- ***Germ cell mutagenicity, Ames-Test: Negative***
- ***Additional toxicological information:***
  By ingestion strong caustic effect on mouth and throat. Ingestion in quantity may cause perforation of esophagus and alimentary tract.
- ***CMR impact (cancer-causing, mutagenic and reproduction endangering effects)***
  Ingredients of the solution do not fulfill the criteria of CMR classes according to CLP.

12: Ecological information

- ***12.1 Toxicity***

Aquatic toxicity:	
1310-58-3 potassium hydroxide	
EC 50 / 48 h	*40 mg/l (aquatic invertebrates)*
	40,4 mg/l (ceriodaphnia dubia)
	45,4 mg/l (Rainbow trout (Oncorhynchus mykiss))
LC 50 /96 h	*80 mg/l (Gambusia affinis)*

- ***12.2 Persistence and degradability*** *No data available.*
- ***12.3 Bioaccumulative potential*** *No data available.*
- ***12.4 Mobility in soil*** *No data available.*
- ***Ecotoxicity:***
- ***Note:*** *All data refer to undiluted substance.*
- ***Behavior in sewage plant:*** *No inhibition of the activity of waste water bacteria after neutralisation.*
- ***Other ecological information:***
  The product does not cause biological oxygen consumption.
  After neutralisation minor harmful impact through composed salts remains. If no neutralisation has been effected, pH-value has to be monitored. Toxical effect on fish and bacteria starts under pH-value of 6 or over pH-value of 9.
- ***General information:*** *Substance may not be released into ground water, water course or sewage system.*
- ***12.5 Results of PBT and vPvB- asseessment***
- ***PBT:*** *Not applicable.*
- ***vPvB:*** *Not applicable.*
- ***12.6 Other adverse effects*** *No other information available.*

13: Disposal considerations

- ***13.1 Waste treatment methods***
  The following instructions refers to the original product and not modifications or derivates. Mixing with other products may require disposal methods other than recommended. In case of doubts consult the supplier or local authorities.
- ***Recommendation:***
  Must not be disposed together with household waste. Do not dispose into a sewage system.
  Recycle utilized product or, if possible, put into another application area. Dispose in accordance with local regulations, for example, deliver the substance to neutralisation.

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- ***Waste code number:***
  Since 01.01.1999 waste code numbers refer to product application areas and not to the product directly. Waste code numbers valid for the application area of the product are to be found in the European Waste Catalogue.

  524 02 Bez.: base, base mixtures and acid cleaning (alkaline)
- ***Contaminated packaging:*** *must be disposed of in accordance with the local regulations.*
- ***Recommendation:***
  Contaminated packaging must be emptied completely and can be recycled or re-used after the proper cleaning.
  Returnable packaging: After emptying the container seal it and return to the supplier without cleaning. Make sure than no foreign substances get into the packaging!
  Other packaging: Empty the packaging completely, clean it properly and then it can be either reconditioned or recycled.
- ***Recommended cleanser:*** *Water, if necessary add cleanser.*

14: Transport information

• ***14.1 UN number***	
• ***ADR, IMDG, IATA***	*UN1814*
• ***14.2 UN proper shipping name***	
• ***ADR***	
• ***IMDG, IATA***	*1814 POTASSIUM HYDROXIDE SOLUTION*
• ***14.3 Transport hazard class***	
• ***ADR***	
• ***Class***	*8 (C5) Corrosive substances*
• ***Hazard label***	*8*
• ***IMDG, IATA***	
• ***Class***	*8 Corrosive substances*
• ***Label***	*8*
• ***14.4 Packing group***	
• ***ADR, IMDG, IATA***	*II*
• ***14.5 Environmental hazards:***	*Not applicable.*
• ***Marine pollutant:***	*No*
• ***14.6 Special precautions for user***	*Not applicable.*
• ***Kemler code:***	*80*
• ***EMS number:***	*F-A,S-B*
• ***14.7 Bulk cargo transportation regulations according to Annex II of MARPOL Convention 73/78 and according to IBC-code***	*Not applicable.*
• ***Transport/other information:***	*Post delivery prohibited.*
• ***ADR***	
• ***Limited quantity (LQ)***	*1L*
• ***Excepted quantities (EQ)***	*Code E2:* *Maximum net quantity per internal packaging: 30 ml* *Maximum net quantity per outer packaging: 500 ml*
• ***Transportation class***	*2*
• ***Tunnel restriction code***	*E*

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- ***Figure/letter:***

- ***IMDG***
- ***Limited quantities (LQ)***

Excepted quantities (EQ) *1L*
Code: E2
Maximum net quantity per inner packaging: 30 ml
Maximum net quantity per outer packaging: 500 ml

- ***UN "Model Regulation":*** *UN1814, POTASSIUM HYDROXIDE SOLUTION, 8, II*

15: Regulatory information

- ***15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture***
- ***National regulations:***

- ***Accident instructions,*** *attachment: not available.*
- ***Classification according to Industrial Safety Regulations (BetrSichV): -***
- ***Water hazard class:*** *1 (self assessment): minor hazard for water.*
- ***15.2 Chemical safety assessment:*** *For this product a chemical safety assessment was not carried out.*

16: Other information

The above information is to be the best of our present knowledge. However it implies no representation or warranties for the product, including without limitation any warranties of merchantability, fitness for a particular purpose with respect to the information set forth herein and constitutes no legally valid contractual relationship. Therefore BRIGON Messtechnik will not be responsible for claims or damage resulting from handling, use, transport, storage or disposal of the product. This MSDS can be used for a.m. Product only. If the substance is used as a component for other products, this MSDS may become invalid.

- ***Relevant H-Statements***

H290 May be corrosive to metals
H302 Harmful if swallowed
H314 Causes severe skin burns and eye damage

- ***Abbreviations and acronyms:***

RPE: Respiratory Protective Equipment
RCR: Risk Characterisation Ratio (RCR= PEC/PNEC)
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 Harmonized System of Classification and Labeling of Chemicals
CLP: Classification, Labeling and Packaging (Regulation (EC) No. 1272/2008)
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)
TRGS: Technische Regeln für Gefahrstoffe (Technical Rules for Dangerous Substances, BAuA, Germany)
DNEL: Derived No-Effect Level (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
Met. Corr.1: Corrosive to metals, Hazard Category 1
Acute Tox. 4: Acute toxicity, Hazard Category 4
Skin Corr. 1A: Skin corrosion/irritation, Hazard Category 1A
Eye Dam. 1: Serious eye damage/eye Irritation, Hazard Category 1