1 Identification

- Product identifier
- Trade name: Barricade Penetrator, CS Powder
- Product code: MP-40BP-PCS
- Recommended use and restriction on use
  - Recommended use: Explosive product.
  - Restrictions on use: Contact manufacturer
- Details of the supplier of the Safety Data Sheet
  - Manufacturer/Supplier: NonLethal Technologies, Inc.
    9419 Rt 286 Hwy W
    Homer City, PA  15748
    USA
    +1 724-479-5100
    nli@nonlethaltechnologies.com
- Emergency telephone number: 1-800-255-3924 (Intl.: +1 813-248-0585) (CHEMTEL # MIS9685256)

2 Hazard(s) identification

- Classification of the substance or mixture
  - Expl. 1.4  H204  Fire or projection hazard.
  - Acute Tox. 3  H301  Toxic if swallowed.
  - Acute Tox. 3  H311  Toxic in contact with skin.
  - Acute Tox. 2  H330  Fatal if inhaled.
  - Skin Irrit. 2  H315  Causes skin irritation.
  - Eye Irrit. 2A  H319  Causes serious eye irritation.
  - Resp. Sens. 1  H334  May cause allergy or asthma symptoms or breathing difficulties if inhaled.
  - Skin Sens. 1  H317  May cause an allergic skin reaction.
  - STOT SE 3  H335  May cause respiratory irritation.

- Label elements
  - GHS label elements
    The product is classified and labeled according to the Globally Harmonized System (GHS).
  - Hazard pictograms:
    ![GHS pictograms]
    GHS01 GHS06 GHS07 GHS08

- Signal word: Danger

- Hazard statements:
  H204  Fire or projection hazard.
  H301+H311  Toxic if swallowed or in contact with skin.
  H330  Fatal if inhaled.
  H315  Causes skin irritation.
  H319  Causes serious eye irritation.
  H334  May cause allergy or asthma symptoms or breathing difficulties if inhaled.
**Trade name:** Barricade Penetrator, CS Powder

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H317</td>
<td>May cause an allergic skin reaction.</td>
</tr>
<tr>
<td>H335</td>
<td>May cause respiratory irritation.</td>
</tr>
</tbody>
</table>

**Precautionary statements:**

- **P200** Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- **P250** Do not subject to grinding/shock/friction.
- **P260** Do not breathe dust.
- **P284** In case of inadequate ventilation wear respiratory protection.
- **P264** Wash thoroughly after handling.
- **P280** Wear protective gloves/protective clothing/eye protection/face protection.
- **P270** Do not eat, drink or smoke when using this product.
- **P271** Use only outdoors or in a well-ventilated area.
- **P272** Contaminated work clothing must not be allowed out of the workplace.
- **P305+P351+P338** If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- **P373** DO NOT fight fire when fire reaches explosives.
- **P370+P380** In case of fire: Evacuate area.
- **P302+P352** IF ON SKIN: Wash with plenty of water.
- **P304+P340** IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- **P342+P311** If experiencing respiratory symptoms: Call a POISON CENTER/doctor.
- **P372** Explosion risk in case of fire.
- **P312** Call a POISON CENTER/doctor if you feel unwell.
- **P333+P313** If skin irritation or rash occurs: Get medical advice/attention.
- **P337+P313** If eye irritation persists: Get medical advice/attention.
- **P301+P310** IF SWALLOWED: Immediately call a POISON CENTER/doctor.
- **P330** Rinse mouth.
- **P361+P364** Take off immediately all contaminated clothing and wash it before reuse.
- **P401** Store in accordance with local/regional/national/international regulations.
- **P405** Store locked up.
- **P403** Store in a well-ventilated place.
- **P501** Dispose of contents/container in accordance with local/regional/national/international regulations.

**Other hazards** There are no other hazards not otherwise classified that have been identified.

**Explosive Product Notice**

PREVENTION OF ACCIDENTS IN THE USE OF EXPLOSIVES - The prevention of accidents in the use of explosives is a result of careful planning and observance of the best known practices. The explosives user must remember that he is dealing with a powerful force and that various devices and methods have been developed to assist him in directing this force. He should realize that this force, if misdirected, may either kill or injure both him and his fellow workers.

WARNING - All explosives are dangerous and must be carefully handled and used following approved safety procedures either by or under the direction of competent, experienced persons in accordance with all applicable federal, state, and local laws, regulations, or ordinances. If you have any questions or doubts as to how to use any explosive product, DO NOT USE IT before consulting with your supervisor, or the manufacturer, if you do not have a supervisor. If your supervisor has any questions or doubts, he should consult the manufacturer before use.

(Cont’d. on page 3)
3 Composition/information on ingredients

- Chemical characterization: Mixtures

<table>
<thead>
<tr>
<th>Components:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2698-41-1 [(2-chlorophenyl)methylene]malononitrile</td>
<td>60-80%</td>
</tr>
<tr>
<td></td>
<td>Acute Tox. 3; H301; Acute Tox. 2; H330</td>
</tr>
<tr>
<td></td>
<td>Resp. Sens. 1, H334</td>
</tr>
<tr>
<td></td>
<td>Acute Tox. 4, H312; Skin Irrit. 2, H315; Eye Irrit. 2A, H319; Skin Sens. 1, H317; STOT SE 3, H335</td>
</tr>
<tr>
<td>7757-79-1 potassium nitrate</td>
<td>10-20%</td>
</tr>
<tr>
<td></td>
<td>OX. Sol. 2; H272</td>
</tr>
<tr>
<td>1309-48-4 magnesium oxide</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>546-93-0 Magnesium carbonate</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>16291-96-6 charcoal</td>
<td>&lt;5%</td>
</tr>
<tr>
<td></td>
<td>Flamm. Sol. 1, H228</td>
</tr>
<tr>
<td>7704-34-9 sulfur</td>
<td>&lt;5%</td>
</tr>
<tr>
<td></td>
<td>Skin Irrit. 2; H315</td>
</tr>
</tbody>
</table>

- Additional information:
  For the wording of the listed Hazard Statements refer to section 16.
  For the listed ingredient(s), the identity and/or exact percentage(s) are being withheld as a trade secret.

- Notable Trace Components (< 0.1% w/w)

<table>
<thead>
<tr>
<th>Components:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>15245-44-0 lead 2,4,6-trinitro-m-phenylene dioxime/ lead styphnate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unst. Expl., H200</td>
</tr>
<tr>
<td></td>
<td>Repr. 1A, H360; STOT RE 2, H373</td>
</tr>
<tr>
<td></td>
<td>Acute Tox. 4, H302; Acute Tox. 4, H332</td>
</tr>
</tbody>
</table>

4 First-aid measures

- Description of first aid measures

- General information:
  Information is only applicable to product contents, and not to product as normally supplied. This information is applicable to damaged, leaking, or spilled product as contact with contents is possible under these conditions.

- After inhalation:
  Remove victim to fresh air.
  Seek immediate medical advice.
  Provide oxygen treatment if affected person has difficulty breathing.
  In case of irregular breathing or respiratory arrest provide artificial respiration.

- After skin contact:
  Immediately remove any clothing soiled by the product.
  Brush off loose particles from skin.
  Immediately wash with water and soap and rinse thoroughly.
  If skin irritation continues, consult a doctor.

- After eye contact:
  Remove contact lenses if worn.
  Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
5 Fire-fighting measures

- **Extinguishing media**
  - Suitable extinguishing agents:
  - DO NOT fight fire when fire reaches explosives.
  - Flood area with water. If no water is available, carbon dioxide, dry chemical or earth may be used. If the fire reaches the cargo, withdraw and let fire burn.
  - For safety reasons unsuitable extinguishing agents: None.

- **Special hazards arising from the substance or mixture**
  - Fire or projection hazard.
  - During heating or in case of fire poisonous gases are produced.
  - Product may explode if burned in confined space. Individual cartridges may explode. Mass explosion of many cartridges at once is unlikely.

- **Advice for firefighters**
  - Protective equipment:
    - Wear self-contained respiratory protective device.
    - Wear fully protective suit.

- **Additional information:**
  - Eliminate all ignition sources if safe to do so.
  - Cool endangered receptacles with water spray.

(Cont'd. on page 5)
Safety Data Sheet
acc. to OSHA HCS (29 CFR 1910.1200)

Printing date: 07/20/2016
Revision: 07/20/2016

Trade name: Barricade Penetrator, CS Powder

Evacuate area and fight fire from the upwind side.
Flammability Classification: (defined by 29 CFR 1910.1200) Explosive. Can explode under fire conditions. Individual devices will randomly explode. Will not mass explode if multiple devices are involved. Burning material may produce toxic and irritating vapors. In unusual cases, shrapnel may be thrown from exploding devices under containment. See 2008 Emergency response Guidebook for further information.

6 Accidental release measures

• Personal precautions, protective equipment and emergency procedures:
  Use respiratory protective device against the effects of fumes/dust/aerosol.
  Wear protective equipment. Keep unprotected persons away.
  Remove persons from danger area.
  Ensure adequate ventilation.
  Protect from heat.
  Isolate area and prevent access.

• Environmental precautions:
  Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

• Methods and material for containment and cleaning up:
  Pick up mechanically.
  Send for recovery or disposal in suitable receptacles.
  Clean the affected area carefully; suitable cleaners are:
  Warm water and cleansing agent

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.

7 Handling and storage

• Handling
  • Precautions for safe handling:
    Use only outdoors or in a well-ventilated area.
    Handle with care. Avoid jolting, friction and impact.
    Avoid breathing dust.
  • Information about protection against explosions and fires:
    Protect from heat.
    Keep respiratory protective device available.
    Emergency cooling must be available in case of nearby fire.

• Conditions for safe storage, including any incompatibilities
  • Storage
    • Requirements to be met by storerooms and receptacles:
      Avoid storage near extreme heat, ignition sources or open flame.
    • Information about storage in one common storage facility:
      Store away from foodstuffs.
      Store away from flammable substances.

(Cont'd. on page 6)
**Trade name:** Barricade Penetrator, CS Powder

- **Further information about storage conditions:** Store in dry conditions.
- **Specific end use(s):** No relevant information available.

---

### 8 Exposure controls/personal protection

#### Control parameters

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

<table>
<thead>
<tr>
<th>Substance</th>
<th>Limit Values</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2698-41-1 [(2-chlorophenyl)methylene]malononitrile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEL (USA)</td>
<td>Long-term value: 0.4 mg/m³, 0.05 ppm</td>
<td></td>
</tr>
<tr>
<td>REL (USA)</td>
<td>Ceiling limit value: 0.4 mg/m³, 0.05 ppm</td>
<td>Skin</td>
</tr>
<tr>
<td>TLV (USA)</td>
<td>Ceiling limit value: 0.39 mg/m³, 0.05 ppm</td>
<td>Skin</td>
</tr>
<tr>
<td>EL (Canada)</td>
<td>Ceiling limit value: 0.05 ppm</td>
<td>Skin</td>
</tr>
<tr>
<td>EV (Canada)</td>
<td>Ceiling limit value: 0.4 mg/m³, 0.05 ppm</td>
<td>Skin</td>
</tr>
<tr>
<td>LMPE (Mexico)</td>
<td>Ceiling limit value: 0.05 ppm</td>
<td>A4, PIEL</td>
</tr>
<tr>
<td>1309-48-4 magnesium oxide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEL (USA)</td>
<td>Long-term value: 15* mg/m³ fume, *total particulate</td>
<td></td>
</tr>
<tr>
<td>TLV (USA)</td>
<td>Long-term value: 10* mg/m³</td>
<td>*as inhalable fraction</td>
</tr>
<tr>
<td>EL (Canada)</td>
<td>Short-term value: 10** mg/m³</td>
<td>Long-term value: 10* 3** mg/m³</td>
</tr>
<tr>
<td>EV (Canada)</td>
<td>Long-term value: 10 mg/m³</td>
<td>Inhalable</td>
</tr>
<tr>
<td>LMPE (Mexico)</td>
<td>Long-term value: 10* mg/m³</td>
<td>A4, *fracción respirable</td>
</tr>
<tr>
<td>546-93-0 Magnesium carbonate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEL (USA)</td>
<td>Long-term value: 15* 5** mg/m³</td>
<td>*total dust **respirable fraction</td>
</tr>
<tr>
<td>REL (USA)</td>
<td>Long-term value: 10* 5** mg/m³</td>
<td>*total dust **respirable fraction</td>
</tr>
<tr>
<td>TLV (USA)</td>
<td>TLV withdrawn</td>
<td></td>
</tr>
<tr>
<td>EL (Canada)</td>
<td>Long-term value: 10* 3** mg/m³</td>
<td>*total dust, **respirable fraction</td>
</tr>
<tr>
<td>EV (Canada)</td>
<td>Long-term value: 10 mg/m³</td>
<td>Total dust</td>
</tr>
</tbody>
</table>

(Cont'd. on page 7)
Safety Data Sheet
acc. to OSHA HCS (29 CFR 1910.1200)

Trade name: Barricade Penetrator, CS Powder

<table>
<thead>
<tr>
<th>LMPE (Mexico)</th>
<th>Short-term value: 20 mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Long-term value: 10 mg/m³</td>
</tr>
</tbody>
</table>

- Exposure controls
  - Engineering measures: Provide adequate ventilation.
  - Personal protective equipment:
    - General protective and hygienic measures:
      The usual precautionary measures for handling chemicals should be followed.
      Immediately remove all soiled and contaminated clothing.
      Do not inhale dust / smoke / mist.
      Avoid contact with the eyes and skin.
      Keep away from foodstuffs, beverages and feed.
      Wash hands before breaks and at the end of work.
  - Engineering controls: Provide adequate ventilation.
  - Breathing equipment:
    - Respiratory protection required.
      Wear positive pressure NIOSH or European EN149 vapor respirators when deploying product in large quantities.
  - Protection of hands:
    - Protective gloves
      Wear gloves when handling deployed rounds.
      The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
  - Eye protection:
    - Safety glasses
      Follow relevant national guidelines concerning the use of protective eyewear.
  - Body protection: Protective work clothing

Limitation and supervision of exposure into the environment
No relevant information available.

Risk management measures
Organizational measures should be in place for all activities involving this product.

9 Physical and chemical properties

- Information on basic physical and chemical properties
  - Appearance:
    - Form: Sealed metal cylinder
    - Color: According to product specification
# Trade name: Barricade Penetrator, CS Powder

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not determined</td>
</tr>
<tr>
<td>pH-value</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting point/Melting range</td>
<td>Not determined</td>
</tr>
<tr>
<td>Boiling point/Boiling range</td>
<td>Not determined</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammability (solid, gaseous)</td>
<td>Fire or projection hazard</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not determined</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Not determined</td>
</tr>
<tr>
<td>Danger of explosion</td>
<td>Heating may cause an explosion</td>
</tr>
<tr>
<td>Explosion limits</td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>Not determined</td>
</tr>
<tr>
<td>Upper</td>
<td>Not determined</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Density</td>
<td>Not determined</td>
</tr>
<tr>
<td>Relative density</td>
<td>Not determined</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Solubility in / Miscibility with</td>
<td>Insoluble</td>
</tr>
<tr>
<td>Water</td>
<td></td>
</tr>
<tr>
<td>Partition coefficient (n-octanol/water)</td>
<td>Not determined</td>
</tr>
<tr>
<td>Viscosity</td>
<td></td>
</tr>
<tr>
<td>Dynamic</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Kinematic</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Other information</td>
<td>No relevant information available</td>
</tr>
</tbody>
</table>

## 10 Stability and reactivity

- **Reactivity**: No relevant information available.
- **Chemical stability**: Not applicable.
- **Thermal decomposition / conditions to be avoided**: No decomposition if used and stored according to specifications.
- **Possibility of hazardous reactions**: Fire or projection hazard.
  Toxic fumes may be released if heated above the decomposition point.
  Contact with acids releases toxic gases.
  Acts as an oxidizing agent on organic materials such as wood, paper and fats.
  Reacts with strong alkali.
- **Conditions to avoid**:
  Excessive heat.
Safety Data Sheet
acc. to OSHA HCS (29 CFR 1910.1200)

Printing date: 07/20/2016
Revision: 07/20/2016

Trade name: Barricade Penetrator, CS Powder

Sources of ignition, open flame, incompatible materials.

Incompatible materials: Oxidizers, strong bases, strong acids

Hazardous decomposition products:
Carbon monoxide and carbon dioxide
Nitrogen oxides
Sulfur oxides (SOx)
Chlorine compounds

11 Toxicological information

Information on toxicological effects

Acute toxicity:

- LD/LC50 values that are relevant for classification:
  2698-41-1 [(2-chlorophenyl)methylene]malononitrile
  Oral LD50 178 mg/kg (rat)

Primary irritant effect:
Effects based on exposure to dusts/mists/spray/vapours released during deployment. Unused product does not possess these effects.

On the skin: Irritant to skin and mucous membranes.

On the eye: Irritating effect.

Sensitization: May cause sensitisation by inhalation and skin contact.

Carcinogenic categories

IARC (International Agency for Research on Cancer):
15245-44-0 lead 2,4,6-trinitro-m-phenylene dioxide/ lead stypnate 2B

NTP (National Toxicology Program):
15245-44-0 lead 2,4,6-trinitro-m-phenylene dioxide/ lead stypnate R

OSHA-Ca (Occupational Safety & Health Administration):
None of the ingredients are listed.

Probable route(s) of exposure:
Inhalation.
Skin contact.
Eye contact.

Acute effects (acute toxicity, irritation and corrosivity):
Irritating to eyes, respiratory system and skin.
Toxic if swallowed or in contact with skin.
Fatal if inhaled.

Repeated dose toxicity: Repeated exposures may result in skin and/or respiratory sensitivity.

CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction)

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.

STOT-single exposure: May cause respiratory irritation.

STOT-repeated exposure: Based on available data, the classification criteria are not met.
### 12 Ecological information

- **Toxicity**
  - **Aquatic toxicity**
    - The product contains materials that are harmful to the environment.

<table>
<thead>
<tr>
<th>EC50 10.2-0.3 mg/kg (Oncorhynchus mykiss)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2698-41-1 [(2-chlorophenyl)methylene]malononitrile</td>
</tr>
</tbody>
</table>

- **Persistence and degradability** No relevant information available.
- **Bioaccumulative potential:** May be accumulated in organism
- **Mobility in soil:** No relevant information available.
- **Ecotoxicological effects:**
  - **Remark:** Harmful to fish
- **Additional ecological information**
  - **General notes:**
    - Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
    - Very toxic for aquatic organisms
    - Due to available data on eliminability/decomposition and bioaccumulation potential prolonged term damage of the environment can not be excluded.
- **Other adverse effects:** No 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.
    - After prior treatment product has to be disposed of in an incinerator for hazardous waste adhering to the regulations pertaining to the disposal of particularly hazardous waste.
    - The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes. Residual materials should be treated as hazardous.
- **Uncleaned packagings**
  - **Recommendation:** Disposal must be made according to official regulations.

### 14 Transport information

- **UN-Number**
  - DOT, ADR, IMDG, IATA: UN0301
- **UN proper shipping name**
  - DOT, ADR, IMDG, IATA: AMMUNITION, TEAR-PRODUCING
Trade name: Barricade Penetrator, CS Powder

- **Transport hazard class(es)**
  - **DOT**
    - Class: 1.4
    - Label: 1.4G
  - **ADR**
    - Class: 1.4
    - Label: 1.4G
  - **IMDG**
    - Class: 1.4
    - Label: 1.4G
  - **IATA**
    - Class: 1.4
    - Label: 1.4G

- **Packing group**
  - **DOT** II

- **Environmental hazards**
  - Product contains environmentally hazardous substances: [(2-chlorophenyl)methylene]malononitrile
  - Marine pollutant: Yes

- **Special precautions for user**
  - EMS Number: Not applicable.
  - F-B,S-Z

- **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**
  - Not applicable.

(Cont'd. on page 12)
**Trade name:** Barricate Penetrator, CS Powder

---

**Transport/Additional information:**

- **IATA**
  - Cargo Aircraft Only.

---

### 15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
  - **United States (USA)**
  - **SARA**

  - **Section 302 (extremely hazardous substances):**
    - None of the ingredients are listed.

  - **Section 304 (emergency release notification):**
    - None of the ingredients are listed.

  - **Section 355 (extremely hazardous substances):**
    - None of the ingredients are listed.

  - **Section 313 (Specific toxic chemical listings):**
    - 7757-79-1 | potassium nitrate
    - All ingredients are listed.

- **Proposition 65 (California)**

  - **Chemicals known to cause cancer:**
    - 15245-44-0 | lead 2,4,6-trinitro-m-phenylene dioxide/ lead styphnate

  - **Chemicals known to cause reproductive toxicity for females:**
    - None of the ingredients are listed.

  - **Chemicals known to cause reproductive toxicity for males:**
    - None of the ingredients are listed.

  - **Chemicals known to cause developmental toxicity:**
    - Present in trace quantities.
    - 15245-44-0 | lead 2,4,6-trinitro-m-phenylene dioxide/ lead styphnate

- **Carcinogenic categories**

- **EPA (Environmental Protection Agency):**
  - None of the ingredients are listed.

- **IARC (International Agency for Research on Cancer):**
  - 15245-44-0 | lead 2,4,6-trinitro-m-phenylene dioxide/ lead styphnate

---

(Cont'd. on page 13)
16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- **Date of preparation / last revision**: 07/20/2016 / -

- **Abbreviations and acronyms:**
  ADR: 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
  CAS: Chemical Abstracts Service (division of the American Chemical Society)
  LC50: Lethal concentration, 50 percent
  LD50: Lethal dose, 50 percent
  NIOSH: National Institute for Occupational Safety
  OSHA: Occupational Safety & Health
  TLV: Threshold Limit Value
  PEL: Permissible Exposure Limit
  REL: Recommended Exposure Limit
  LDLo: Lowest Lethal Dose Observed
  Expl. 1.4: Explosives – Division 1.4
  Flam. Sol. 1: Flammable solids – Category 1
  Ox. Sol. 2: Oxidizing solids – Category 2
  Acute Tox. 3: Acute toxicity – Category 3
  Acute Tox. 4: Acute toxicity – Category 4
  Acute Tox. 2: Acute toxicity – Category 2
  Skin Irrit. 2: Skin corrosion/irritation – Category 2
  Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A
  Resp. Sens. 1: Respiratory sensitisation – Category 1
  Skin Sens. 1: Skin sensitisation – Category 1
  STOT SE 3: Specific target organ toxicity (single exposure) – Category 3

- **Sources**
  Website, European Chemicals Agency (echa.europa.eu)
  Website, US EPA Substance Registry Services (ofmpub.epa.gov/sor internet/registry/substreg/home/overview/home.do)
  Website, Chemical Abstracts Registry, American Chemical Society (www.cas.org)
  Safety Data Sheets, Individual Manufacturers
  SDS Prepared by:
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