Appendix A

Comparison of MSDS/SDS Elements

The following tables provide a comparison of MSDS elements for the following:

- **Globally Harmonized System**\(^1\)
- **ISO Safety Data Sheet for Chemical Products 11014-1: 2003 DRAFT**\(^2\)
- **ANSI MSDS Preparation Z400.1- 2004**\(^3\)
- **OSHA Hazard Communication Standard 29#CFR#1910.1200**\(^4\)

<table>
<thead>
<tr>
<th>MSDS Sections</th>
<th>GHS SDS(^1)</th>
<th>ISO MSDS(^2)</th>
<th>ANSI MSDS(^3)</th>
<th>OSHA MSDS(^4)</th>
</tr>
</thead>
</table>
| 1. Product and company identification | - GHS product identifier.  
- Other means of identification.  
- Recommended use of the chemical and restrictions on use.  
- Supplier’s details (including name, address, phone number etc).  
- Emergency phone number. | - GHS product identifier.  
- Other means of identification.  
- Recommended use of the chemical and restrictions on use.  
- Supplier’s details (including name, address, phone number etc).  
- Emergency phone number. | - Product identity same as on label  
- Product name, product code  
- name, address and telephone number of supplier  
- emergency telephone number | - Product identity same as on label.  
- Name address and telephone number of the manufacturer, distributor, employer or other responsible party. |
| 2. Hazards identification        | - GHS classification of the substance/mixture and any regional information.  
- GHS label elements, including precautionary statements. (Hazard symbols may be provided as a graphical reproduction of the | - GHS classification of the substance/mixture and any regional information.  
- GHS label elements, including precautionary statements. (Hazard symbols may be provided as a graphical reproduction of the | - Emergency Overview (description of product and most significant immediate physical, health and environmental concerns)  
- OSHA Regulatory Status  
- Potential health effects (information on adverse human health effects and symptoms, relevant route(s) | - health hazards including acute and chronic effects, listing target organs or systems  
- signs & symptoms of exposure  
- conditions generally recognized as aggravated by |
<table>
<thead>
<tr>
<th>MSDS Sections</th>
<th>GHS SDS&lt;sup&gt;1&lt;/sup&gt;</th>
<th>ISO MSDS&lt;sup&gt;2&lt;/sup&gt;</th>
<th>ANSI MSDS&lt;sup&gt;3&lt;/sup&gt;</th>
<th>OSHA MSDS&lt;sup&gt;4&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3. Composition/information on ingredients</strong></td>
<td><strong>Substance</strong></td>
<td><strong>Substance</strong></td>
<td><strong>Substance</strong></td>
<td><strong>Substance</strong></td>
</tr>
<tr>
<td></td>
<td>Chemical identity</td>
<td>Chemical identity</td>
<td>common chemical name(s)</td>
<td>Chemical and common name of ingredients contributing to known hazards</td>
</tr>
<tr>
<td></td>
<td>Common name, synonyms, etc.</td>
<td>Common name, synonyms etc.</td>
<td>generic name(s)</td>
<td>For untested mixtures, the chemical &amp; common name of ingredients at 1% or more that present a health hazard and those that present a physical hazard in the mixture</td>
</tr>
<tr>
<td></td>
<td>CAS number, EC number, etc.</td>
<td>CAS number, EC number, etc.</td>
<td>synonyms</td>
<td>Ingredients at 0.1% or greater, if carcinogens</td>
</tr>
<tr>
<td></td>
<td>Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance.</td>
<td>Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance.</td>
<td>CAS number(s)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Mixture</strong></td>
<td><strong>Mixture</strong></td>
<td>components or impurities contributing to the hazard (name, concentration)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The chemical identity and concentration or concentration ranges of all ingredients which are hazardous within the meaning of the GHS and are present above their</td>
<td>The chemical identity and concentration or concentration ranges of all ingredients which are hazardous within the meaning of the GHS and are present above their</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>symbols in black and white or the name of the symbol, e.g., flame, skull and crossbones.)</td>
<td>symbols in black and white or the name of the symbol, e.g., flame, skull and crossbones.)</td>
<td>and length of exposure, type and severity of effects, target organs, medical symptoms that are aggravated by exposure)</td>
<td>exposure</td>
</tr>
<tr>
<td></td>
<td>▪ Other hazards which do not result in classification (e.g., dust explosion hazard) or are not covered by the GHS.</td>
<td>▪ Other hazards which do not result in classification (e.g., dust explosion hazard) or are not covered by the GHS.</td>
<td>▪ if listed as a carcinogen by OSHA, IARC, NTP</td>
<td>▪ primary routes of exposure</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>▪ environmental effects</td>
<td>▪ if listed as a carcinogen by OSHA, IARC, NTP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ physical hazards, including the potential for fire, explosion, and reactivity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- GHS SDS: Globally Harmonized System of Classification and Labeling of Chemicals
- ISO MSDS: International Standard for Material Safety Data Sheets
- ANSI MSDS: American National Standards Institute MSDS
- OSHA MSDS: Occupational Safety and Health Administration MSDS
- MSDS Comparison:
- Symbols in black and white or the name of the symbol, e.g., flame, skull and crossbones.
- Other hazards which do not result in classification (e.g., dust explosion hazard) or are not covered by the GHS.
- Exposure:
  - Primary routes of exposure
  - If listed as a carcinogen by OSHA, IARC, NTP
  - Physical hazards, including the potential for fire, explosion, and reactivity
<table>
<thead>
<tr>
<th>MSDS Sections</th>
<th>GHS SDS$^1$</th>
<th>ISO MSDS$^2$</th>
<th>ANSI MSDS$^3$</th>
<th>OSHA MSDS$^4$</th>
</tr>
</thead>
</table>
| 4. First-aid measures | - Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact and ingestion.  
- Most important symptoms/effects, acute and delayed.  
- Indication of immediate medical attention and special treatment needed, if necessary. | - Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact and ingestion.  
- Most important symptoms/effects, acute and delayed.  
- Indication of immediate medical attention and special treatment needed, if necessary. | - first aid procedures by route of exposure, i.e., inhalation, skin contact, eye contact, ingestion  
- important symptoms and effects useful for diagnostic treatment  
- antidotes  
- notes to a physician | - emergency & first aid procedures |
| 5. Firefighting measures | - Suitable (and unsuitable) extinguishing media.  
- Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products). | - Suitable (and unsuitable) extinguishing media.  
- Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products). | - Qualitative flammable and reactivity properties  
- suitable extinguishing media  
- unsuitable extinguishing media  
- Guidance to firefighters  
- Specific hazards arising from | - generally applicable control measures  
- flammable property information such as flashpoint  
- physical hazards including the |
<table>
<thead>
<tr>
<th>MSDS Sections</th>
<th>GHS SDS¹</th>
<th>ISO MSDS²</th>
<th>ANSI MSDS³</th>
<th>OSHA MSDS⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Accidental release measures</td>
<td>▪ Special protective equipment and precautions for firefighters.</td>
<td>▪ Special protective equipment and precautions for firefighters.</td>
<td>the chemical</td>
<td>potential for fire, explosion, and reactivity</td>
</tr>
<tr>
<td></td>
<td>▪ Environmental precautions.</td>
<td>▪ Environmental precautions.</td>
<td>▪ Protective equipment and precautions for firefighters</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Methods and materials for containment and cleaning up.</td>
<td>▪ Methods and materials for containment and cleaning up.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Handling and storage</td>
<td>▪ Precautions for safe handling.</td>
<td>▪ Precautions for safe handling.</td>
<td>handling</td>
<td>procedures for clean up of spills and leaks</td>
</tr>
<tr>
<td></td>
<td>▪ Conditions for safe storage, including any incompatibilities.</td>
<td>▪ Conditions for safe storage, including any incompatibilities.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Exposure controls/personal protection</td>
<td>▪ Control parameters (e.g., occupational exposure limit values or)</td>
<td>▪ Control parameters (e.g., occupational exposure limit values or)</td>
<td>exposure guidelines (limit values)</td>
<td>General applicable control measures</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>engineering controls to</td>
<td>appropriate</td>
</tr>
<tr>
<td>MSDS Sections</td>
<td>GHS SDS¹</td>
<td>ISO MSDS²</td>
<td>ANSI MSDS³</td>
<td>OSHA MSDS⁴</td>
</tr>
<tr>
<td>---------------</td>
<td>----------</td>
<td>-----------</td>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>9. Physical and chemical properties</td>
<td>Appearance (physical state, colour, etc.)</td>
<td>Appearance (physical state, colour, etc.)</td>
<td>appearance (color, physical form, shape)</td>
<td>characteristics of hazardous chemicals such as vapor pressure &amp; density.</td>
</tr>
<tr>
<td></td>
<td>Odour</td>
<td>Odour</td>
<td>odor/odor threshold</td>
<td>physical hazards including the potential for fire, explosion, and reactivity.</td>
</tr>
<tr>
<td></td>
<td>Odour threshold</td>
<td>Odour threshold</td>
<td>physical state</td>
<td></td>
</tr>
<tr>
<td></td>
<td>pH</td>
<td>pH</td>
<td>pH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>melting point/freezing point</td>
<td>melting point/freezing point</td>
<td>melting/freezing point(specify which)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>initial boiling point and boiling range</td>
<td>initial boiling point and boiling range</td>
<td>initial boiling point and boiling range</td>
<td></td>
</tr>
<tr>
<td></td>
<td>flash point</td>
<td>flash point</td>
<td>flash point</td>
<td></td>
</tr>
<tr>
<td></td>
<td>evaporation rate</td>
<td>evaporation rate</td>
<td>evaporation rate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>flammability (solid, gas)</td>
<td>flammability (solid, gas)</td>
<td>flammability (solid, gas)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>upper/lower flammability or explosive limits</td>
<td>upper/lower flammability or explosive limits</td>
<td>upper/lower flammability or explosive limits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>vapour pressure</td>
<td>vapour pressure</td>
<td>vapour pressure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>vapour density</td>
<td>vapour density</td>
<td>vapour density</td>
<td></td>
</tr>
<tr>
<td></td>
<td>relative density: solubility(ies)</td>
<td>relative density: solubility(ies)</td>
<td>relative density: solubility(ies)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>partition coefficient: n-octanol/water</td>
<td>partition coefficient: n-octanol/water</td>
<td>partition coefficient: n-octanol/water</td>
<td></td>
</tr>
<tr>
<td></td>
<td>auto-ignition</td>
<td>auto-ignition</td>
<td>auto-ignition</td>
<td></td>
</tr>
</tbody>
</table>
## MSDS Comparison

<table>
<thead>
<tr>
<th>MSDS Sections</th>
<th>GHS SDS(^1)</th>
<th>ISO MSDS(^2)</th>
<th>ANSI MSDS(^3)</th>
<th>OSHA MSDS(^4)</th>
</tr>
</thead>
</table>
| 10. Stability and reactivity | - Chemical stability.  
- Possibility of hazardous reactions.  
- Conditions to avoid (e.g., static discharge, shock or vibration).  
- Incompatible materials.  
- Hazardous decomposition products. | - Chemical stability.  
- Possibility of hazardous reactions.  
- Conditions to avoid (e.g., static discharge, shock or vibration).  
- Incompatible materials.  
- Hazardous decomposition products. | - Physical hazards  
- chemical stability  
- conditions to avoid  
- Incompatible Materials  
- hazardous decomposition products  
- Possibility of Hazardous Reactions | - organic peroxides, pyrophoric, unstable # (reactive), or water-reactive hazards  
- physical hazards, including reactivity and hazardous polymerization |
| 11. Toxicological information | - Concise but complete and comprehensible description of the various toxicological (health) effects and the available data used to identify those effects, including:  
  - Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact);  
  - Symptoms related to the physical, chemical and toxicological characteristics;  
  - Delayed and immediate effects and also chronic effects from short- and long-term exposure;  
  - Numerical measures of toxicity (such as acute) | - Concise but complete and comprehensible description of the various toxicological (health) effects and the available data used to identify those effects, including:  
  - Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact);  
  - Symptoms related to the physical, chemical and toxicological characteristics;  
  - Delayed and immediate effects and also chronic effects from short- and long-term exposure;  
  - Numerical measures of toxicity (such as acute) | - Toxicological information: human, animal, and in vitro data, SAR  
- acute dose effects: single/short-term exposures. (e.g., LD50, LC50).  
- Repeated dose effects: (e.g., NOAEL)  
- Irritation/Corrosivity  
- Sensitization (skin and respiratory)  
- Carcinogenicity  
- Neurological effects  
- Genetic effects (e.g., mutagenicity)  
- Reproductive effects  
- Developmental effects  
- Target organ effects | - See also Section 2 [health hazards Including acute and chronic effects, listing target organs or systems  
- signs & symptoms of exposure  
- primary routes of exposure  
- if listed as a carcinogen by OSHA, IARC, NTP] |
<table>
<thead>
<tr>
<th>MSDS Sections</th>
<th>GHS SDS(^1)</th>
<th>ISO MSDS(^2)</th>
<th>ANSI MSDS(^3)</th>
<th>OSHA MSDS(^4)</th>
</tr>
</thead>
</table>
| 12. Ecological information | • Ecotoxicity (aquatic and terrestrial, where available).  
  • Persistence and degradability  
  • Bioaccumulative potential  
  • Mobility in soil  
  • Other adverse effects | • Ecotoxicity (aquatic and terrestrial, where available).  
  • Persistence and degradability  
  • Bioaccumulative potential  
  • Mobility in soil  
  • Other adverse effects | • ecotoxicity acute and longterm (fish, invertebrates)  
  • persistence / degradability  
  • bioaccumulation / bioconcentration  
  • mobility: air, soil, water  
  • Other adverse effects | • No present requirements. |
| 13. Disposal considerations | • Description of waste residues and information on their safe handling and methods of disposal, including any contaminated packaging. | • Description of waste residues and information on their safe handling and methods of disposal, including any contaminated packaging. | • safe and environmentally preferred waste management of the material and/or its container  
  • classification under applicable law | • No present requirements,  
  • See section 7, |
| 14. Transport information | • UN number.  
  • UN Proper shipping name.  
  • Transport Hazard class(es).  
  • Packing group, if applicable.  
  • Marine pollutant (Y/N).  
  • Special precautions which a user needs to be aware of or needs to comply with in connection with transport or conveyance | • UN number.  
  • UN Proper shipping name.  
  • Transport Hazard class(es).  
  • Packing group, if applicable.  
  • Marine pollutant (Y/N).  
  • Special precautions which a user needs to be aware of or needs to comply with in connection with transport or conveyance | • proper shipping name  
  • hazard class(es)  
  • identification number  
  • packing group  
  • hazardous substances  
  • marine pollutants (Y/N)  
  • IMDG classification  
  • TDG classification  
  • ICAO/IATA classification  
  • RID/ADR classification | • No present requirements, |
### MSDS Comparison

<table>
<thead>
<tr>
<th>MSDS Sections</th>
<th>GHS SDS¹</th>
<th>ISO MSDS²</th>
<th>ANSI MSDS³</th>
<th>OSHA MSDS⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. Regulatory information</td>
<td>either within or outside their premises.</td>
<td>either within or outside their premises.</td>
<td>U.S federal regulations</td>
<td>No present requirements.</td>
</tr>
<tr>
<td>16. Other information</td>
<td>Safety, health and environmental regulations specific for the product in question.</td>
<td>Safety, health and environmental regulations specific for the product in question.</td>
<td>label text, hazard rating and rating system, information on preparation and revision of safety data sheet, Key/legend</td>
<td>Date of preparation of MSDS or date of last change</td>
</tr>
</tbody>
</table>

2. ISO 11014-1:2003 DRAFT Safety Data Sheet for Chemical Products.