1.1. Identification

PRODUCT NAME: Niacinamide  
CAS RN: 98-92-0  
EC#: 202-713-4  
SYNONYMS: 3-Pyridinecarboxamide, Niacinamide, Nicotinamide, 3-Carbamoylpyridine, 3-Pyridinecarboxamide, Vitamin B, beta-Pyridinecarboxamidem-(Aminocarbonyl)pyridine  
SYSTEMATIC NAME: 3-Pyridinecarboxamide  
MOLECULAR FORMULA: C₆H₆N₂O

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses

Niacinamide is used as a nutrient supplement in Pharmaceutical products. It has been used in the enrichment of bread, flour, and other grain-derived products. Animal feed is routinely supplemented with nicotinamide. It is also used in multi-vitamin preparations and dietary supplement. It is used in the treatment of pellagra.

Uses advised against: None

1.3. Details of the supplier of the safety data sheet

Jubilant Life Sciences Limited

FACTORY & REGISTERED OFFICE: Jubilant Life Sciences Ltd.Unit-1Plot No. P1-L1 within Jubilant Sector Specific SEZ for Chemicals at Plot No-5 Vilayat GIDC, Tal-Vagra, Dist. Bharuch-392012Gujarat,IndiaTel: +91-2641-281500, 281507 Fax: +91-2641-281515

HEAD OFFICE: Jubilant Life Sciences Ltd., Plot 1-A, Sector 16-A, Institutional Area, Noida, Uttar Pradesh, 201301 – India  
T +91-120-4361000 - F +91-120-4234881 / 84 / 87 / 95 / 96 support@jubl.com - www.jubl.com

1.4. Emergency telephone number

Emergency telephone: +91-9925236834 & +91-2641-281666

SECTION 2:  Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Serious Eye Damage/ Eye Irritation: Category 2A

2.2. Label Elements

Hazard Pictogram: GHS 07

Signal Word: Warning!

HAZARD AND PRECAUTIONARY STATEMENTS:

HAZARD STATEMENTS

- H319: Causes serious eye irritation.

PRECAUTIONARY STATEMENTS

- P264: Wash hands, eyes and face thoroughly after handling.
- P280: Wear protective gloves/clothing and eye/face protection.
- P305 + P351 + P338: IF IN EYES, Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rising.
- P337 + P313: If eye irritation persists: Get medical advice/attention
- P405: Store locked up.
- P501: Dispose of contents/container in accordance with local/regional/national/ international regulations.
SECTION 3: Composition/information on ingredients

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS #</th>
<th>Purity</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Niacinamide</td>
<td>98-92-0</td>
<td>≥98.5%,w/w</td>
<td>Serious Eye Damage/ Eye Irritation: Category 2A</td>
</tr>
</tbody>
</table>

SECTION 4: First aid measures

4.1. Description of first aid measures

Key symptoms:
- **Acute effects:** It causes serious eye irritation.
- **Chronic effects:** Affects the kidneys, eyes & liver.

**FIRST AID:**
- **Eyes:** If in eyes rinse cautiously with water for at least 15 minutes. Remove contact lenses if easy to do so. Continue rinsing. Seek medical attention.
- **Skin:** Immediately take off all contaminated clothing. Wash thoroughly with water for at least 15 minutes. Wash contaminated clothes before reuse. Seek immediate medical attention.
- **Inhalation:** Remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if you feel unwell. Monitor for respiratory distress. Apply artificial respiration if not breathing. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Toxic vapours may be released on thermal decomposition including nitrogen oxides, carbon monoxide and cyanide.
- **Ingestion:** If swallowed call a poison center if you feel unwell. Rinse mouth. Do NOT induce vomiting by use of emetics. Seek medical attention.

SECTION 5: FIRE-FIGHTING MEASURES

**Extinguishing media**
- Appropriate extinguishing media: Dry chemical powder, carbon dioxide, and alcohol resistant foam. Water may be in effective. Water sprays can be effective in cooling down the fire-exposed containers and knocking down the vapours. Water jets may be used to flush spills away and dilute the same to non-flammable mixtures fog or alcohol-resistant foam by directing streams to the periphery of the fires to prevent spread. Do not permit water to get inside containers.

**Special Protective Equipment and Precautions for Fire Fighter**
- Evacuate the area and fight fires from a safe distance.
- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions or as per locally valid procedures.
- Fire fighters must wear Self Contained Breathing Apparatus (SCBA) and full protective clothing. The chemical is harmful in contact with skin.
- Report any run-off of fire waters contaminated with this chemical as per local and federal procedures applicable.

**Unusual fire and explosion hazard**
- Toxic vapors may be released on thermal decomposition including nitrogen oxides, carbon monoxide and cyanide.
- High vapor concentration may result in an explosion hazard.
- Vapors are heavier than air. May travel considerable distance from source and flashback.

SECTION 6: ACCIDENTAL RELEASE MEASURES

**Minor Spills**
- Clean up all spills immediately following relevant Standard Operating Procedures.
- Avoid breathing vapors and contact with skin and eyes.
- Shut off leak source if possible.
- Shut off all possible sources of ignition.
- Wear protective clothing, boots, impervious gloves and safety glasses.
- Wipe up.
- Decontaminate all equipment.
- Use non-sparking tools.

**Major Spill**
- Alert Emergency Responders and tell them location and nature of hazard.
- Shut off all possible sources of ignition and increase ventilation.
- Wear protective clothing, full boots, impervious gloves, safety glasses and Self Contained Breathing Apparatus (SCBA), as may be deemed appropriate.
- Clear area of personnel and move upwind.
- Stop leaks if possible.
- Prevent, by any means available, spillage from entering drains or water and watercourses.
Niacinamide  
Safety Data Sheet  
according to the federal final rule of hazard communication revised on 2012 (HazCom 2012)

- Collect recoverable product into labeled containers for recycling, recovery or disposal.  
- Contain spill with sand, earth or vermiculite.  
- Spread area with lime or absorbent material, and leave for at least 1 hour before washing.  
- Clean up all tools and equipment.  
- Inform authorities in event of contamination of any public sewers, drains or water bodies.

SECTION 7: HANDLING AND STORAGE

Precautions for safe handling
- Do not breathe vapor or mist.  
- Wear protective gloves/clothing and eye/face protection.  
- Wash thoroughly after handling.  
- Ground and secure containers when dispensing or pouring product.  
- Avoid contact with incompatible materials.  
- When handling, DO NOT eat, drink or smoke.  
- Launder contaminated clothing before re-use.  
- If on skin or hair, IMMEDIATELY remove all contaminated clothing and rinse/shower with plenty of water.  
- Use in a well ventilated place / Use protective clothing commensurate with exposure levels.  
- Use non-sparking tools.

Storage
- Store in a cool, well ventilated place.  
- Store in a flame proof area.  
- Store away from incompatible materials.  
- Keep only in original container.  
- Keep securely closed when not in use.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters
- Exposure Limits Values

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>ACGIH</th>
<th>NIOSH</th>
<th>OSHA-Final PELs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Niacinamide</td>
<td>None Listed</td>
<td>None Listed</td>
<td>None Listed</td>
</tr>
</tbody>
</table>

Exposure Limits (International):
- OEL-RUSSIA: STEL 1 mg/m³

Exposure Controls
- Provide exhaust ventilation or other engineering controls to keep the relevant airborne concentrations below their respective occupational exposure limits. Local ventilation is usually preferred. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protection:
- Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier.  
  - **Eyes:** Safety goggles / Chemical Safety glasses and Face shield.  
  - **Clothing:** Boots and clothing to prevent contact.  
  - **Respirator:** Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Hand protection:
- In full contact:
  - Glove material: nitrile rubber  
  - Layer thickness: 0.11 mm  
  - Breakthrough time: > 480 Min.

- In splash contact:
  - Glove material: nitrile rubber  
  - Layer thickness: 0.11 mm  
  - Breakthrough time: > 480 Min.

The protective gloves to be used must comply with the specifications of EC directive 89/686/EEC and the resultant standard EN374, for example KCL 740 Dermatril® (full contact), 740 Dermatril® (splash contact).
SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Parameter</th>
<th>Typical value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Appearance</td>
<td>White crystalline powder</td>
</tr>
<tr>
<td>2</td>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>3</td>
<td>Odor Threshold</td>
<td>Not available</td>
</tr>
<tr>
<td>4</td>
<td>Melting point</td>
<td>128-131°C</td>
</tr>
<tr>
<td>5</td>
<td>Boiling point</td>
<td>157 deg C at 5X10^{-4} mm Hg</td>
</tr>
<tr>
<td>6</td>
<td>Flash point</td>
<td>182°C</td>
</tr>
<tr>
<td>7</td>
<td>Evaporation rate (n-BuAc=1)</td>
<td>Not available</td>
</tr>
<tr>
<td>8</td>
<td>Explosive limits</td>
<td>Not available</td>
</tr>
<tr>
<td>9</td>
<td>Vapor pressure</td>
<td>4.2X10^{-3} mm Hg at 25 deg C (est)</td>
</tr>
<tr>
<td>10</td>
<td>Vapor density (air=1)</td>
<td>Not available</td>
</tr>
<tr>
<td>11</td>
<td>Specific gravity (water=1)</td>
<td>1.400 at 25 deg C</td>
</tr>
<tr>
<td>12</td>
<td>Solubility</td>
<td>Freely soluble in water and in alcohol. Soluble in Glycerin.</td>
</tr>
<tr>
<td>13</td>
<td>PH @ 5%aq solution water at 25°C</td>
<td>5.35 to 5.5</td>
</tr>
<tr>
<td>14</td>
<td>Log Kow (octanol/water)</td>
<td>-0.37 (estimated)</td>
</tr>
<tr>
<td>15</td>
<td>Auto-ignition temperature</td>
<td>480°C</td>
</tr>
<tr>
<td>16</td>
<td>Decomposition temperature</td>
<td>&gt;140°C</td>
</tr>
<tr>
<td>17</td>
<td>Viscosity</td>
<td>Not available</td>
</tr>
<tr>
<td>18</td>
<td>Molecular Weight</td>
<td>122.12</td>
</tr>
<tr>
<td>19</td>
<td>pKa (@20°C)</td>
<td>3.35</td>
</tr>
<tr>
<td>20</td>
<td>Koc</td>
<td>51.56 (estimated)</td>
</tr>
<tr>
<td>21</td>
<td>Flammable material</td>
<td>No</td>
</tr>
<tr>
<td>22</td>
<td>Oxidizer</td>
<td>No</td>
</tr>
<tr>
<td>23</td>
<td>Pyrophoric material</td>
<td>No</td>
</tr>
<tr>
<td>24</td>
<td>Explosive material</td>
<td>No</td>
</tr>
</tbody>
</table>

SECTION 10: STABILITY AND REACTIVITY

- **Stability:** Stable under normal temperatures and conditions.
- **Conditions to avoid:** Dust generation.
- **Incompatible chemicals:** Strong acids and bases, strong oxidizing agents.
- **Hazardous decomposition:** Burning may produce hazardous combustion gases like Nitrogen oxides, carbon monoxide, carbon dioxide.
- **Hazardous Polymerization:** Not expected.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

- **Acute toxicity**
  It causes irritation to the mucous membranes and upper respiratory tract.
  - It causes eye irritation.

**CHRONIC EFFECTS:**
- Affects the kidneys, eyes & liver.
- RTECS#: QS36750000
- LD50/LC50:

<table>
<thead>
<tr>
<th>Acute Oral LD50 (Rat)</th>
<th>3530-3540 mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Dermal LD50 (: Rabbit)</td>
<td>&gt;2000 mg/kg</td>
</tr>
</tbody>
</table>
• Skin irritation: rabbit, Patch test OECD 404, 1981: Not irritating
• Eye irritation: rabbit, OECD Guideline 405: moderately irritating
• Sensitization
  o Type: Beuhler test.
  o Species: Guinea pig.
  o Result: not sensitizing.

REPEATED DOSE TOXICITY:
  o Species: Rat (Wistar)
  o Route of administration: oral feed
  o Exposure period: 28 days
  o Doses: 215 and 1000 mg/kg
  o Method: OECD Guideline- 407 " Repeated dose oral toxicity- Rodent"
  o Year: 1981
  o GLP: yes
  o Remark: Effects: decreased body weight and food consumption in males; increased transaminases; spleen weight reduced in males liver, weight increased in females; minimal to mild hypertrophy in liver; reduced extra medullary hematopoiesis, all findings were reversible.

• Skin corrosion/irritation
  • No information is available.
• Serious eye damage/irritation
  • Causes serious eye irritation.
• Respiratory or skin sensitization
  • No information is available.
• Germ cell Mutagenicity
  • No data is available.
• Carcinogenicity
  • Species: Mouse (swiss)
  • Route of administration: oral feed
  • Exposure period: life span study (110 weeks)
  • Doses: 1%, average daily intake, m: 100.5 mg, f: 66.3 mg.
  • Method: Other
  • GLP: No
  • Result: Consumption of nicotinamide caused no apparent carcinogenic action
  • Source: Degussa Antwerpen N.V. Antwerpen 4
• Reproductive toxicity
  • No data is available.
• STOT-single exposure
  • No data is available.
• STOT- repeated exposure
  • No data available.
• Aspiration Hazards
  • No data available.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity
• Ecotoxicity:
  • Fish toxicity: P. reticulataLC50 : 4200 mg/l/96h.
  • Daphnia magna EC50: >1000 mg/L/24 hr.
  • Algal toxicity: Desmodesmus subspicatus NOEC: 560 mg/l/72h.

Persistence and degradability
• AEROBIC: Nicotinamide was determined to be readily biodegradable in an aerobic screening test recommended by the Department of Environment, Standing Committee of Analysts, UK(1).
• ANAEROBIC: Nicotinamide was not degraded using an anaerobic spore-forming rod (Clostridia sp.) bacteria isolated from Potamac River mud(1).
Niacinamide
Safety Data Sheet
according to the federal final rule of hazard communication revised on 2012 (HazCom 2012)

Bioaccumulative potential (Predicted)

- BCF = 3
- Log Kow = -0.37

Based on the Log Kow and Bio concentration factor value it is expected to have low potential to concentrate in fatty tissue of fish and aquatic organisms.

Mobility in soil

- Log Koc = 15 (If released to soil, nicotinamide is expected to have very high mobility based upon estimated KOC value.)
- Henry's Law Constant = 2.9X10⁻¹² atm-cu m/mole. (Volutilization from moist soil surfaces is not expected to be an important fate process based upon an estimated Henry's Law constant)
- Log Kow = -0.37 (Very Low bioaccumulation is expected).

Other adverse effects

Environment Fate:

- Nicotinamide's production and use as a medication and dietary supplement may result in its release to the environment through various waste streams.
- If released to air, an estimated vapor pressure of 4.2X10⁻⁴ mm Hg at 25 deg C indicates nicotinamide will exist in both the vapor and particulate phases in the atmosphere.
- Vapor-phase nicotinamide will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 7 days.
- If released to soil, nicotinamide is expected to have very high mobility based upon an estimated Koc of 15.
- Volatilization from moist soil surfaces is not expected to be an important fate process based upon an estimated Henry's Law constant of 2.9X10⁻¹² atm-cu m/mole.
- If released into water, nicotinamide is not expected to adsorb to suspended solids and sediment based upon the estimated Koc.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

- Burn in a chemical incinerator equipped with an afterburner and scrubber.
- Exert extra care in igniting, as this material is combustible.
- Dispose of this material in accordance with standard practice for disposal of potentially hazardous materials as required by applicable federal, state or local laws. Note that disposal regulations may also apply to empty containers and equipment reinstates.

SECTION 14: Transport information

- This substance is considered to be Non Hazardous for transport by Air/Rail/Road and Sea and thus not regulated by IATA/ICAO/ARD/RID/IMO/IMDG.

Environmental hazards

- It is expected that this chemical is not a marine pollutant and is not Harmful to the Aquatic environment.

SECTION 15: REGULATORY INFORMATION

- European Union Information
  Classifier as per CLP Regulation 1272/2008:
  - Eye Irrit Cat.2
  - Hazard Statements: : H319

US information

- TSCA
  - CAS# 98-92-0 is listed on the TSCA inventory.

WGK (Water Danger/Protection)

- CAS# 98-92-0: 0

Canada

- CAS# 98-92-0 is listed on Canada’s DSL List.
- CAS# 98-92-0 is not listed on Canada’s Ingredient Disclosure List.

SECTION 16: OTHER INFORMATION

a) Compilation information of safety data sheet

Date of compilation : March 06, 2012
Chemical : Niacinamide
CAS # : 98-92-0
File Name : 0014BhGhs08 Div.4 sds Niacinamide
Revision Number : 08
Date of Issue of SDS : January 12, 2016
Revision Due Date : December, 2017
Supersedes date : September 10, 2015
b) A key or legend to aberrations and acronyms used in the safety data sheet

- PBT = Persistent Bioaccumulative and Toxic.
- vPvB = Very Persistent and Very Bioaccumulative.
- SCBA = Self Contained Breathing Apparatus.
- NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit.
- OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit.
- OELTWA = Occupational Exposure Limit Time Weighted Averages.
- IDLH = Immediately Dangerous to Life or Health.
- UEL = Upper Explosive Limit.
- LEL = Lower Explosive Limit.
- RTECS = Registry of Toxic Effects of Chemical Substances.
- NTP = National Toxicology Program
- IARC = International Agency for Research on Cancer.
- EPA = Environmental Protection Agency.
- TSCA = Toxic Substances Control Act.
- SARA = Superfund Amendments and Reauthorization Act.
- NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit.
- OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit.
- OELTWA = Occupational Exposure Limit Time Weighted Averages.
- IDLH = Immediately Dangerous to Life or Health.
- UEL = Upper Explosive Limit.
- LEL = Lower Explosive Limit.
- RTECS = Registry of Toxic Effects of Chemical Substances.
- NTP = National Toxicology Program.
- IARC = International Agency for Research on Cancer.
- EPA = Environmental Protection Agency.
- TSCA = Toxic Substances Control Act.
- SARA = Superfund Amendments and Reauthorization Act.
- NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit.
- OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit.
- OELTWA = Occupational Exposure Limit Time Weighted Averages.
- IDLH = Immediately Dangerous to Life or Health.
- UEL = Upper Explosive Limit.
- LEL = Lower Explosive Limit.
- RTECS = Registry of Toxic Effects of Chemical Substances.
- NTP = National Toxicology Program.
- IARC = International Agency for Research on Cancer.
- EPA = Environmental Protection Agency.
- TSCA = Toxic Substances Control Act.
- SARA = Superfund Amendments and Reauthorization Act.
- NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit.
- OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit.
- OELTWA = Occupational Exposure Limit Time Weighted Averages.
- IDLH = Immediately Dangerous to Life or Health.
- UEL = Upper Explosive Limit.
- LEL = Lower Explosive Limit.
- RTECS = Registry of Toxic Effects of Chemical Substances.
- NTP = National Toxicology Program.
- IARC = International Agency for Research on Cancer.
- EPA = Environmental Protection Agency.
- TSCA = Toxic Substances Control Act.
- SARA = Superfund Amendments and Reauthorization Act.
- NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit.
- OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit.
- OELTWA = Occupational Exposure Limit Time Weighted Averages.
- IDLH = Immediately Dangerous to Life or Health.
- UEL = Upper Explosive Limit.
- LEL = Lower Explosive Limit.
- RTECS = Registry of Toxic Effects of Chemical Substances.
- NTP = National Toxicology Program.
- IARC = International Agency for Research on Cancer.
- EPA = Environmental Protection Agency.
- TSCA = Toxic Substances Control Act.
- SARA = Superfund Amendments and Reauthorization Act.
- NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit.
- OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit.
- OELTWA = Occupational Exposure Limit Time Weighted Averages.
- IDLH = Immediately Dangerous to Life or Health.
- UEL = Upper Explosive Limit.
- LEL = Lower Explosive Limit.
- RTECS = Registry of Toxic Effects of Chemical Substances.
- NTP = National Toxicology Program.
- IARC = International Agency for Research on Cancer.
- EPA = Environmental Protection Agency.
- TSCA = Toxic Substances Control Act.
- SARA = Superfund Amendments and Reauthorization Act.
- NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit.
- OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit.
- OELTWA = Occupational Exposure Limit Time Weighted Averages.
- IDLH = Immediately Dangerous to Life or Health.
- UEL = Upper Explosive Limit.
- LEL = Lower Explosive Limit.
- RTECS = Registry of Toxic Effects of Chemical Substances.
- NTP = National Toxicology Program.
- IARC = International Agency for Research on Cancer.
- EPA = Environmental Protection Agency.
- TSCA = Toxic Substances Control Act.
- SARA = Superfund Amendments and Reauthorization Act.
- NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit.
- OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit.
- OELTWA = Occupational Exposure Limit Time Weighted Averages.
- IDLH = Immediately Dangerous to Life or Health.
- UEL = Upper Explosive Limit.
- LEL = Lower Explosive Limit.
- RTECS = Registry of Toxic Effects of Chemical Substances.
- NTP = National Toxicology Program.
- IARC = International Agency for Research on Cancer.
- EPA = Environmental Protection Agency.
- TSCA = Toxic Substances Control Act.
- SARA = Superfund Amendments and Reauthorization Act.
- NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit.
- OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit.
- OELTWA = Occupational Exposure Limit Time Weighted Averages.
- IDLH = Immediately Dangerous to Life or Health.
- UEL = Upper Explosive Limit.
- LEL = Lower Explosive Limit.
- RTECS = Registry of Toxic Effects of Chemical Substances.
- NTP = National Toxicology Program.
- IARC = International Agency for Research on Cancer.
- EPA = Environmental Protection Agency.
- TSCA = Toxic Substances Control Act.
- SARA = Superfund Amendments and Reauthorization Act.
- NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit.
- OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit.
- OELTWA = Occupational Exposure Limit Time Weighted Averages.
- IDLH = Immediately Dangerous to Life or Health.
- UEL = Upper Explosive Limit.
- LEL = Lower Explosive Limit.
- RTECS = Registry of Toxic Effects of Chemical Substances.
- NTP = National Toxicology Program.
- IARC = International Agency for Research on Cancer.
- EPA = Environmental Protection Agency.
- TSCA = Toxic Substances Control Act.
- SARA = Superfund Amendments and Reauthorization Act.
- NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit.
- OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit.
- OELTWA = Occupational Exposure Limit Time Weighted Averages.
- IDLH = Immediately Dangerous to Life or Health.
- UEL = Upper Explosive Limit.
- LEL = Lower Explosive Limit.
- RTECS = Registry of Toxic Effects of Chemical Substances.
- NTP = National Toxicology Program.
- IARC = International Agency for Research on Cancer.
- EPA = Environmental Protection Agency.
- TSCA = Toxic Substances Control Act.
- SARA = Superfund Amendments and Reauthorization Act.
- NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit.
- OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit.
- OELTWA = Occupational Exposure Limit Time Weighted Averages.
- IDLH = Immediately Dangerous to Life or Health.
- UEL = Upper Explosive Limit.
- LEL = Lower Explosive Limit.
- RTECS = Registry of Toxic Effects of Chemical Substances.
- NTP = National Toxicology Program.
- IARC = International Agency for Research on Cancer.
- EPA = Environmental Protection Agency.
- TSCA = Toxic Substances Control Act.
- SARA = Superfund Amendments and Reauthorization Act.
- NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit.
- OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit.
- OELTWA = Occupational Exposure Limit Time Weighted Averages.
- IDLH = Immediately Dangerous to Life or Health.
- UEL = Upper Explosive Limit.
- LEL = Lower Explosive Limit.
- RTECS = Registry of Toxic Effects of Chemical Substances.