Safety Data Sheet
acc. to OSHA HCS

Printing date 09/11/2019 Reviewed on 09/11/2019

1 Identification

· **Product identifier**

· **Product Name: Multi-element Solution 2A**

· **Part Name:**
CLMS-2A
CLMS-2AN
· **Application of the substance / the mixture** Certified Reference Material

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
SPEX CertiPrep, LLC.
203 Norcross Ave, Metuchen,
NJ 08840 USA

· **Information department:** product safety department
· **Emergency telephone number:**
Emergency Phone Number (24 hours)
CHEMTREC (800-424-9300)
Outside US: 703-527-3887

2 Hazard(s) identification

· **Classification of the substance or mixture**

GHS05 Corrosion

Skin Corr. 1B H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.

· **Label elements**
· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms**

GHS05

· **Signal word** Danger

· **Hazard-determining components of labeling:**
nitric acid
· **Hazard statements**
H314 Causes severe skin burns and eye damage.
· **Precautionary statements**
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.
P321 Specific treatment (see on this label).
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
· **Classification system:**
· **NFPA ratings (scale 0 - 4)**

Health = 3
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 3
Fire = 0
Reactivity = 0

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

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· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization: Mixtures**
· **Description:** Mixture of the substances listed below with nonhazardous additions.

· **Dangerous components:**		
7697-37-2	nitric acid	5.0%

· **Chemical identification of the substance/preparation**		
7439-95-4	magnesium	0.001%
7440-22-4	silver	0.001%
7440-28-0	Thallium from Thallium nitrate	0.001%
7440-66-6	zinc powder -zinc dust (stabilized)	0.001%
7440-41-7	Beryllium from Beryllium Acetate	0.001%
7440-43-9	cadmium (non-pyrophoric)	0.001%
7440-50-8	copper	0.001%
7439-96-5	manganese	0.001%
7440-02-0	nickel	0.001%
7439-92-1	Lead from Lead Oxide	0.001%
7429-90-5	aluminium	0.001%
7440-38-2	arsenic	0.001%
7440-48-4	cobalt	0.001%
7440-47-3	Chromium from Chromium(III) nitrate nonahydrate	0.001%
7440-46-2	Cesium from Cesium nitrate	0.001%
7440-23-5	Sodium from Sodium carbonate	0.001%
7440-17-7	Rubidium from Rubidium nitrate	0.001%
7440-24-6	Strontium from Strontium carbonate	0.001%
7440-55-3	gallium	0.001%
7439-89-6	iron	0.001%
7440-09-7	potassium	0.001%
7439-93-2	Lithium from Lithium carbonate	0.001%
7782-49-2	selenium	0.001%
7440-61-1	Uranium from Uranyl Nitrate Hexahydrate	0.001%
7440-62-2	Vanadium from Ammonium trioxovanadate	0.001%
7440-70-2	Calcium from Calcium carbonate	0.001%
7440-39-3	Barium from Barium carbonate	0.001%
7732-18-5	water, distilled, conductivity or of similar purity	94.973%

4 First-aid measures

· **Description of first aid measures**
· **General information:** Immediately remove any clothing soiled by the product.
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:** Immediately rinse with water.
· **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing:** Do not give anything to eat or drink - Do not induce vomitting
· **Information for Doctor:**
· **Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed** No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:** Use fire fighting measures that suit the environment.
· **Special hazards arising from the substance or mixture** During heating or in case of fire poisonous gases are produced.

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· **Advice for firefighters**
· **Protective equipment:** Mouth respiratory protective device.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Mount respiratory protective device.
Wear protective equipment. Keep unprotected persons away.
· **Environmental precautions:**
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
· **Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralizing agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· **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.
· **Protective Action Criteria for Chemicals**

· **PAC-1:**		
7697-37-2	nitric acid	0.16 ppm
7439-95-4	magnesium	18 mg/m³
7440-22-4	silver	0.3 mg/m³
7440-28-0	Thallium from Thallium nitrate	0.06 mg/m³
7440-66-6	zinc powder -zinc dust (stabilized)	6 mg/m³
7440-41-7	Beryllium from Beryllium Acetate	0.0023 mg/m³
7440-43-9	cadmium (non-pyrophoric)	0.10 mg/m³
7440-50-8	copper	3 mg/m³
7439-96-5	manganese	3 mg/m³
7440-02-0	nickel	4.5 mg/m³
7439-92-1	Lead from Lead Oxide	0.15 mg/m³
7440-38-2	arsenic	1.5 mg/m³
7440-48-4	cobalt	0.18 mg/m³
7440-47-3	Chromium from Chromium(III) nitrate nonahydrate	1.5 mg/m³
7440-46-2	Cesium from Cesium nitrate	5.6 mg/m³
7440-23-5	Sodium from Sodium carbonate	13 mg/m³
7440-17-7	Rubidium from Rubidium nitrate	3.9 mg/m³
7440-24-6	Strontium from Strontium carbonate	30 mg/m³
7440-55-3	gallium	30 mg/m³
7439-89-6	iron	3.2 mg/m³
7440-09-7	potassium	2.3 mg/m³
7439-93-2	Lithium from Lithium carbonate	3.3 mg/m³
7782-49-2	selenium	0.6 mg/m³
7440-61-1	Uranium from Uranyl Nitrate Hexahydrate	0.6 mg/m³
7440-62-2	Vanadium from Ammonium trioxovanadate	3 mg/m³
7440-39-3	Barium from Barium carbonate	1.5 mg/m³

· **PAC-2:**		
7697-37-2	nitric acid	24 ppm
7439-95-4	magnesium	200 mg/m³
7440-22-4	silver	170 mg/m³
7440-28-0	Thallium from Thallium nitrate	3.3 mg/m³
7440-66-6	zinc powder -zinc dust (stabilized)	21 mg/m³
7440-41-7	Beryllium from Beryllium Acetate	0.025 mg/m³
7440-43-9	cadmium (non-pyrophoric)	0.76 mg/m³
7440-50-8	copper	33 mg/m³
7439-96-5	manganese	5 mg/m³
7440-02-0	nickel	50 mg/m³

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7439-92-1	Lead from Lead Oxide	120 mg/m³
7440-38-2	arsenic	17 mg/m³
7440-48-4	cobalt	2 mg/m³
7440-47-3	Chromium from Chromium(III) nitrate nonahydrate	17 mg/m³
7440-46-2	Cesium from Cesium nitrate	61 mg/m³
7440-23-5	Sodium from Sodium carbonate	140 mg/m³
7440-17-7	Rubidium from Rubidium nitrate	43 mg/m³
7440-24-6	Strontium from Strontium carbonate	330 mg/m³
7440-55-3	gallium	330 mg/m³
7439-89-6	iron	35 mg/m³
7440-09-7	potassium	25 mg/m³
7439-93-2	Lithium from Lithium carbonate	36 mg/m³
7782-49-2	selenium	6.6 mg/m³
7440-61-1	Uranium from Uranyl Nitrate Hexahydrate	5 mg/m³
7440-62-2	Vanadium from Ammonium trioxovanadate	5.8 mg/m³
7440-39-3	Barium from Barium carbonate	180 mg/m³

· **PAC-3:**		
7697-37-2	nitric acid	92 ppm
7439-95-4	magnesium	1,200 mg/m³
7440-22-4	silver	990 mg/m³
7440-28-0	Thallium from Thallium nitrate	20 mg/m³
7440-66-6	zinc powder -zinc dust (stabilized)	120 mg/m³
7440-41-7	Beryllium from Beryllium Acetate	0.1 mg/m³
7440-43-9	cadmium (non-pyrophoric)	4.7 mg/m³
7440-50-8	copper	200 mg/m³
7439-96-5	manganese	1,800 mg/m³
7440-02-0	nickel	99 mg/m³
7439-92-1	Lead from Lead Oxide	700 mg/m³
7440-38-2	arsenic	100 mg/m³
7440-48-4	cobalt	20 mg/m³
7440-47-3	Chromium from Chromium(III) nitrate nonahydrate	99 mg/m³
7440-46-2	Cesium from Cesium nitrate	370 mg/m³
7440-23-5	Sodium from Sodium carbonate	870 mg/m³
7440-17-7	Rubidium from Rubidium nitrate	260 mg/m³
7440-24-6	Strontium from Strontium carbonate	2,000 mg/m³
7440-55-3	gallium	2,000 mg/m³
7439-89-6	iron	150 mg/m³
7440-09-7	potassium	150 mg/m³
7439-93-2	Lithium from Lithium carbonate	220 mg/m³
7782-49-2	selenium	40 mg/m³
7440-61-1	Uranium from Uranyl Nitrate Hexahydrate	30 mg/m³
7440-62-2	Vanadium from Ammonium trioxovanadate	35 mg/m³
7440-39-3	Barium from Barium carbonate	1,100 mg/m³

7 Handling and storage

· **Handling:**
· **Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of aerosols.
· **Information about protection against explosions and fires:** Keep respiratory protective device available.

· **Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** No special requirements.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** Keep receptacle tightly sealed.

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

8 Exposure controls/personal protection

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

· **Control parameters**

· **Components with limit values that require monitoring at the workplace:**	
7697-37-2 nitric acid	
PEL	Long-term value: 5 mg/m³, 2 ppm
REL	Short-term value: 10 mg/m³, 4 ppm Long-term value: 5 mg/m³, 2 ppm
TLV	Short-term value: 10 mg/m³, 4 ppm Long-term value: 5.2 mg/m³, 2 ppm

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes.
Avoid contact with the eyes and skin.
· **Respiratory protection:**
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.
· **Protection of hands:**

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
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**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **Eye protection:**

Tightly sealed goggles

9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Liquid
Color:	According to product specification
· **Odor:**	Characteristic
· **Odour Threshold:**	Not applicable.
· **pH-value:**	Not applicable.
· **Change in condition**	
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	83 °C (181.4 °F)
· **Flash point:**	Not applicable.

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· **Flammability (solid, gaseous):**	Not applicable.
· **Decomposition temperature:**	Not applicable.
· **Auto igniting:**	Product is not selfigniting.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not applicable.
Upper:	Not applicable.
· **Vapor pressure at 20 °C (68 °F):**	23 hPa (17.3 mm Hg)
· **Density at 20 °C (68 °F)**	1.02648 g/cm³ (8.56598 lbs/gal)
· **Relative density**	Not applicable.
· **Vapor density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with**	
Water:	Fully miscible.
· **Partition coefficient (n-octanol/water):**	Not applicable.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Solvent content:**	
Water:	95.0 %
VOC content:	0.00 %
Solids content:	0.0 %
· **Other information**	No further relevant information available.

10 Stability and reactivity

· **Reactivity** No further relevant information available.
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known.
· **Conditions to avoid** No further relevant information available.
· **Incompatible materials:** No further relevant information available.
· **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**
· **Primary irritant effect:**
· **on the skin:** Caustic effect on skin and mucous membranes.
· **on the eye:**
Strong caustic effect.
Strong irritant with the danger of severe eye injury.
· **Sensitization:** No sensitizing effects known.
· **Additional toxicological information:**
The product shows the following dangers according to internally approved calculation methods for preparations:
Corrosive
Irritant

· **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**		
7440-41-7	Beryllium from Beryllium Acetate	1
7440-43-9	cadmium (non-pyrophoric)	1
7440-02-0	nickel	2B
7439-92-1	Lead from Lead Oxide	2B
7440-38-2	arsenic	1
7440-48-4	cobalt	2B
7440-47-3	Chromium from Chromium(III) nitrate nonahydrate	3

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7782-49-2	selenium	3

· **NTP (National Toxicology Program)**		
7440-41-7	Beryllium from Beryllium Acetate	K
7440-43-9	cadmium (non-pyrophoric)	K
7440-02-0	nickel	R
7439-92-1	Lead from Lead Oxide	R
7440-38-2	arsenic	K
7440-48-4	cobalt	R

· **OSHA-Ca (Occupational Safety & Health Administration)**	
7440-43-9	cadmium (non-pyrophoric)
7440-38-2	arsenic

12 Ecological information

· **Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Water hazard class 2 (Self-assessment): hazardous for water
Do not allow product to reach ground water, water course or sewage system.
Must not reach bodies of water or drainage ditch undiluted or unneutralized.
Danger to drinking water if even small quantities leak into the ground.
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further 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.

· **Uncleaned packagings:**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agent:** Water, if necessary with cleansing agents.

14 Transport information

· **UN-Number**	
· **DOT, ADR, IMDG, IATA**	UN3264
· **UN proper shipping name**	
· **DOT**	Corrosive liquid, acidic, inorganic, n.o.s. (Nitric acid Solution)
· **ADR**	3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID SOLUTION)
· **IMDG, IATA**	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID SOLUTION)
· **Transport hazard class(es)**	
· **DOT**	

· **Class**	8 Corrosive substances

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· **Label**	8
· **ADR, IMDG, IATA**	
	
· **Class**	8 Corrosive substances
· **Label**	8
· **Packing group**	
· **DOT, ADR, IMDG, IATA**	III
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Warning: Corrosive substances
· **Danger code (Kemler):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Stowage Category**	A
· **Stowage Code**	SW2 Clear of living quarters.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **ADR**	
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
· **IMDG**	
· **Limited quantities (LQ)**	5L
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
· **UN "Model Regulation":**	UN 3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID SOLUTION), 8, III

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **Sara**

· **Section 313 (Specific toxic chemical listings):**	
7697-37-2	nitric acid
7440-22-4	silver
7440-28-0	Thallium from Thallium nitrate
7440-66-6	zinc powder -zinc dust (stabilized)
7440-41-7	Beryllium from Beryllium Acetate
7440-43-9	cadmium (non-pyrophoric)
7440-50-8	copper
7439-96-5	manganese
7440-02-0	nickel
7439-92-1	Lead from Lead Oxide
7429-90-5	aluminium
7440-38-2	arsenic
7440-48-4	cobalt
7440-47-3	Chromium from Chromium(III) nitrate nonahydrate
7439-93-2	Lithium from Lithium carbonate
7782-49-2	selenium
7440-62-2	Vanadium from Ammonium trioxovanadate
7440-39-3	Barium from Barium carbonate

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· **TSCA (Toxic Substances Control Act):**
All components have the value ACTIVE.

· **Hazardous Air Pollutants**

7439-96-5	manganese
7439-92-1	Lead from Lead Oxide
7440-48-4	cobalt

· **Proposition 65**

· **Chemicals known to cause cancer:**

7440-41-7	Beryllium from Beryllium Acetate
7440-43-9	cadmium (non-pyrophoric)
7440-02-0	nickel
7439-92-1	Lead from Lead Oxide
7440-38-2	arsenic
7440-48-4	cobalt

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

· **Chemicals known to cause reproductive toxicity for males:**

7440-43-9	cadmium (non-pyrophoric)

· **Chemicals known to cause developmental toxicity:**

7440-43-9	cadmium (non-pyrophoric)
7439-93-2	Lithium from Lithium carbonate

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency)**

7440-22-4	silver	D
7440-66-6	zinc powder -zinc dust (stabilized)	D, I, II
7440-41-7	Beryllium from Beryllium Acetate	B1, K/L(inh), CBD(oral)
7440-43-9	cadmium (non-pyrophoric)	B1
7440-50-8	copper	D
7439-96-5	manganese	D
7439-92-1	Lead from Lead Oxide	B2
7440-38-2	arsenic	A
7782-49-2	selenium	D
7440-39-3	Barium from Barium carbonate	D, CBD(inh), NL(oral)

· **TLV (Threshold Limit Value established by ACGIH)**

7440-43-9	cadmium (non-pyrophoric)	A2
7440-02-0	nickel	A5
7439-92-1	Lead from Lead Oxide	A3
7429-90-5	aluminium	A4
7440-38-2	arsenic	A1
7440-48-4	cobalt	A3
7440-61-1	Uranium from Uranyl Nitrate Hexahydrate	A1
7440-39-3	Barium from Barium carbonate	A4

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**

7440-43-9	cadmium (non-pyrophoric)
7440-02-0	nickel
7440-38-2	arsenic
7440-61-1	Uranium from Uranyl Nitrate Hexahydrate

· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms**

GHS05

· **Signal word** Danger

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· **Hazard-determining components of labeling:**
nitric acid
· **Hazard statements**
H314 Causes severe skin burns and eye damage.
· **Precautionary statements**
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.
P321 Specific treatment (see on this label).
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

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.

· **Department issuing SDS:** product safety department
· **Contact:**
SPEX CertiPrep, LLC.
1-732-549-7144
· **Date of preparation / last revision** 09/11/2019 / -
· **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
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
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)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
VOC: Volatile Organic Compounds (USA, EU)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Skin Corr. 1B: Skin corrosion/irritation – Category 1B
Eye Dam. 1: Serious eye damage/eye irritation – Category 1