MATERIAL SAFETY DATA SHEET
Cobalt Solution 8% (Cobalt Sulphate)

Section 01 - Product And Company Information

Product Identifier .................................. Cobalt Solution 8%

Product Use ........................................ Preping magnetic oxides for recording tapes, electrowinning of copper, metal finishing, animal feed industry

Supplier Name ....................................... ClearTech Industries Inc.
1500 Quebec Avenue
Saskatoon, SK. Canada
S7K 1V7

Prepared By ......................................... ClearTech Industries Inc. Technical Department
Phone: (800)387-7503

24-Hour Emergency Phone ................. (800)387-7503

Section 02 - Composition / Information on Ingredients

Hazardous Ingredients .......................... Cobaltous Sulphate > 20%
Water < 80%

CAS Number ........................................ Cobaltous Sulphate 10124-43-3
Water 7732-18-5

Synonym (s) ........................................ Cobaltous sulphate, cobalt(II) sulphate

Section 03 - Hazard Identification
Inhalation. Harmful if inhaled. Causes irritation to the respiratory tract. May cause allergic respiratory reaction. Cobalt is a known allergen that produces characteristic symptoms of asthma, such as wheezing, dry cough and labored breathing. Usually the asthma symptoms appear 4-6 hours after exposure and often worsen again later in the same day. Other cobalt-containing compounds such as hard metal dust, but not cobalt powder itself, are associated with subacute fibrosis alveolitis and chronic diffuse interstitial pulmonary fibrosis.

Skin Contact / Absorption. May cause allergic contact dermatitis if there is prior sensitization. Most rashes associated with cobalt occur on the hands and appear within the first year of occupational exposure to cobalt.

Eye Contact. Causes eye irritation.

Ingestion. Harmful if swallowed.

Exposure Limits. OSHA/TWA: 0.1 mg/m³ (as cobalt compounds)
ACGIH/TLV: 0.02 mg/m³ (as cobalt compounds)

Section 04 - First Aid Measures

Inhalation. Remove victim to fresh air. Give artificial respiration only if breathing has stopped. If breathing is difficult, give oxygen. Seek immediate medical attention.

Skin Contact / Absorption. Remove contaminated clothing. Begin deconamination with running water. Minimum flushing is for 5 minutes. Wash affected area with soap and water. Seek medical attention if irritation occurs or persists.

Eye Contact. Contact lenses should never be worn when working with this product. Flush immediately with water for at least 20 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye tissue. Seek immediate medical attention.

Ingestion. Immediately call a poison control center for the most current information. Give large amounts of water to drink if person is completely conscious. Seek immediate medical attention.
Additional Information

Toxic concentrations of cobalt in urine and blood are not well defined. In the general population, the 95th percentile for cobalt concentration was 8.3 ug/l in urine (National Health and Nutrition Examination Survey III). Chelation treatments for example, calcium disodium edetate or dimercaprol, are controversial. Contact a poison control center for current recommendations. Individuals with polymorphism in the HLA-DP gene (presence of glutamate 69 in the beta chain) may be more susceptible to cobalt toxicity.

Medical Conditions Aggravated By Exposure:
Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney, or respiratory function may be more susceptible to the effects of the substance. Persons with allergies or sensitivity to cobalt may also be more susceptible to the effects of the substance.

Recommendations To Physicians: Treat symptoms and eliminate overexposure.

Section 05 - Fire Fighting Measures

Conditions of Flammability
Contact with strong oxidizers may cause fire.

Means of Extinction
Not applicable as product does not burn. Use appropriate extinguishing materials for the surrounding fire such as: water spray, foam, carbon dioxide, dry chemical.

Flash Point
Non-flammable

Auto-ignition Temperature
Not applicable

Upper Flammable Limit
Not applicable

Lower Flammable Limit
Not applicable

Hazardous Combustible Products
Fumes of cobalt oxide and sulphur dioxide

Special Fire Fighting Procedures
Wear NIOSH-approved self-contained breathing apparatus and protective clothing. Isolate materials not yet involved in the fire and protect personnel. Move containers from the fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff from entering storm drains, bodies of water, or other environmentally sensitive areas.

Explosion Hazards
Not considered a fire or explosion hazard.
Section 06 - Accidental Release Measures

Leak / Spill. Wear appropriate personal protective equipment if required. Ventilate area. Stop or reduce leak if safe to do so. Prevent material from entering sewers. Contain discharged material. Absorb spill using an absorbant, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as saw dust. Place in a proper container for reclamation or disposal. Dispose of in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.

Deactivating Materials. Not available

Section 07 - Handling and Storage

Handling Procedures. Use proper equipment for lifting and transporting all containers. Use sensible industrial hygiene and housekeeping practices. Wash thoroughly after handling. Avoid all situations that could lead to harmful exposure.

Storage Requirements. This material should be stored in sealed containers to avoid dampness and dust. Partly used containers should be sealed and must be properly labeled. Avoid excess heat and incompatible materials.

Section 08 - Personal Protection and Exposure Controls

Protective Equipment

Eyes. Chemical goggles, full-face shield, or a full-face respirator is to be worn at all times when product is handled. Contact lenses should never be worn; they may contribute to severe eye injury.

Respiratory. Maintain airborne contaminant concentrations below guidelines listed in section 03 Exposure limits. Use a Canadian CSA Standard Z94.4-93 approved respirator if exposure may, or does exceed occupational exposure limits.

Gloves. Impervious gloves of chemically resistant material (rubber or PVC) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.

Clothing. Body suits, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.

Footwear. Impervious boots of chemically resistant material should be worn.
Engineering Controls

Ventilation Requirements. Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions must be provided in accordance with all fire codes and regulatory requirements. Supply sufficient replacement air to make up for air removed by exhaust systems.

Other. Emergency shower and eyewash must be available and tested in accordance with regulations and be in close proximity.

Section 09 - Physical and Chemical Properties

Physical State. Liquid

Odor and Appearance. Red-purple solution with no odor.

Odor Threshold. Not Applicable

Specific Gravity (Water=1). 1.25 at 25°C

Vapor Pressure (mm Hg, 20°C). Not available

Vapor Density (Air=1). Not available

Evaporation Rate. Slower than ether (ether=1)

Boiling Point. Not available

Freeze/Melting Point. Not available

pH. 2.5-3.5

Water/Oil Distribution Coefficient. Not available

Bulk Density. 10.4 lbs/US gal

% Volatiles by Volume. Not available

Solubility in Water. Not available

Molecular Formula. Not available

Molecular Weight. Not available

Section 10 - Stability and Reactivity

Stability. Stable under conditions of normal storage and use.
Incompatibility.......................... Strong oxidizers, tert-butyl hydroperoxide.

Hazardous Products of Decomposition.... Oxides of sulphur and the contained metal.

Polymerization.......................... Will not occur.

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Section 11 - Toxicological Information

Irritancy................................ Irritating when inhaled and contact with skin.

Sensitization.......................... This product can be irritating to the skin, eyes, and respiratory system with prolonged contact.

Chronic/Acute Effects.............. Repeated oral administration may produce goiter and reduced thyroid activity. Prolonged or repeated skin exposure may cause dermatitis. Chronic exposure may affect the kidney, heart, and lung.

Synergistic Materials............. Not available

Animal Toxicity Data.................. LD_{50} (rat,oral):424 mg/kg

Carcinogenicity....................... SUSPECTED CANCER AGENT: Ingredients within this product are found on the following lists: Federal OSHA Z List, NTP, IARC, or CAL/OSHA and therefore are considered to be, or suspected to be, cancer-causing agents by these agencies.

CARCINOGENIC EFFECTS:

IARC has classified cobalt and cobalt compounds as Group 2B carcinogens; possibly carcinogenic to humans. ACGIH has classified cobalt and cobalt compounds as Group A3 carcinogens; proven carcinogenic to animals. NTP:No OSHA Regulated: No

The National Toxicology Program has classified cobalt sulfate as "reasonably anticipated to be a human carcinogen." The listing is based on findings from long-term inhalation studies of this chemical in laboratory animals where it caused lung tumors in both mice and rats and adrenal-gland tumors in female rats.

Reproductive Toxicity.............. This product and its components may effect the human reproductive system.

Teratogenicity......................... Not available

Mutagenicity.......................... Not available
Section 12 - Ecological Information

Fish Toxicity........................................ Not available
Biodegradability.................................. Not available

Environmental Effects......................... All work practices must be aimed at eliminating environmental contamination.
This product is expected to be harmful to aquatic life in very low concentrations.
Very toxic to aquatic life with long lasting effects.

Section 13 - Disposal Consideration

Waste Disposal................................. Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.

Section 14 - Transport Information

TDG Classification

Shipping Name................................. Cobalt Sulphate Solution. Environmentally Hazardous Substance, Liquid, N.O.S.
Class............................................... 9
Group............................................... III
PIN Number.......................... UN3082

Other........................................... Secure containers (full and/or empty) with suitable hold down devices during shipment and ensure all caps, valves, or closures are secured in the closed position.

PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 16 of this MSDS / SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and/or published test data regarding the classification of this product are listed in the references at section 16 of this MSDS / SDS.

Section 15 - Regulatory Information

WHMIS Classification......................... D1, D2
NOTE: THE PRODUCT LISTED ON THIS MSDS HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN CONTROLLED PRODUCTS REGULATIONS. THIS MSDS CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS.

Section 16 - Other Information

Version # ................................................ Two
Preparation Date ......................... November 30, 2012
Revision Date ................................. September 23, 2014
Revision Note ............................. Updated CTI and technical information.

Note: The responsibility to provide a safe workplace remains with the user. The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment. The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material. It is the responsibility of the user to comply with all applicable laws and regulations.

Attention: Receiver of the chemical goods / MSDS coordinator

As part of our commitment to the Canadian Association of Chemical Distributors (CACD) Responsible Distribution® initiative, ClearTech Industries Inc. and its associated companies require, as a condition of sale, that you forward the attached Material Safety Data Sheet(s) to all affected employees, customers, and end-users. ClearTech will send any available supplementary handling, health, and safety information to you at your request.

If you have any questions or concerns please call our customer service or technical service department.

ClearTech Industries Inc. - Locations

Corporate Head Office: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V7
Phone: 306-664-2522
Fax: 306-665-6216

www.ClearTech.ca

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