ZINC SULPHATE MONOHYDRATE
Safety Data Sheet- MSDS

Update version -IV-

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

COBALTOUS SULFATE HEPTAHYDRATE

OTHER NAMES

Co-S-O4, "cobalt sulphate", "cobalt monosulfate", "cobalt monosulphate", "cobaltous sulfate", "cobaltous sulphate", "cobalt (II) sulfate", "cobalt (II) sulphate", "cobalt (II) sulfate 7-hydrate", "cobalt sulfate"

PRODUCT USE

Ceramics, pigments, glazes, in plating baths for cobalt, additive to soils, catalyst, paint and ink drier, storage batteries.

SUPPLIER

DRON INDUSTRIES, 72 Kamla Amrut Industrial Estate Off Torrent Pharma Indrad-382715
Ta- Kadi -Dis Mehsana Gujrat -India www.dronindustries.in, contact@dronindustries.in
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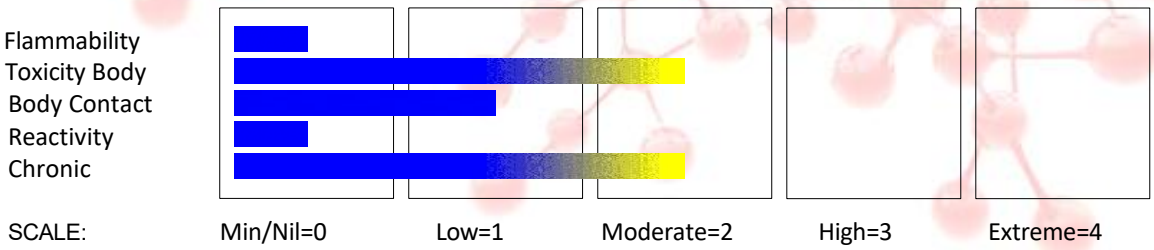
HAZARD RATINGS



Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Toxicity (Inhalation)
Category 4 Acute Toxicity (Oral)
Category 4 Carcinogen Category 2
Skin Sensitizer Category 1

EMERGENCY OVERVIEW

HAZARD

WARNING
Determined by using GHS criteria:
H332 H302 H317 H351
Harmful if
inhaled Harmful
if swallowed
May cause allergic skin reaction
Suspected of causing cancer

PRECAUTIONARY STATEMENTS

Prevention

Contaminated clothing should not be allowed out of the workplace. Obtain special instructions before use.
Use only outdoors or in a well ventilated area. Avoid breathing dust/fume/gas/mist/vapours/spray. Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product. Use personal protective equipment as required.
Do not handle until all safety precautions have been read and understood.

Response

If exposed or concerned: Get medical attention advice.
If skin irritation or rash occurs, seek medical advice/attention. Wash contaminated clothing before reuse.
Call a POISON CENTER or doctor/physician if you feel unwell.
Specific treatment: refer to Label or MSDS.
IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. IF ON SKIN: Gently wash with plenty of soap and water.

Storage Store locked up

Disposal

Dispose of contents and container in accordance with relevant legislation

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
Cobalt (II) sulfate, heptahydrate	10026-24-1	>97

Section 4 - FIRST AID MEASURES

SWALLOWED

For advice, contact a Poisons Information Centre or a doctor.

IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY. For advice, contact a Poisons Information Centre or a doctor. Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise: Induce vomiting with fingers down the back of the of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position if possible) to maintain open airway and prevent respiration.

NOTE: Wear a protective glove when inducing vomiting by mechanical means.

In the meantime, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.

If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.

If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

EYE

If this product comes in contact with the eyes: Wash out immediately with fresh running water. Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. If pain persists or recurs seek medical attention. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

If skin contact occurs: Immediately remove all contaminated clothing, including footwear. Flush skin and hair with running water (and soap if available). Seek medical attention in event of irritation

INHALED

If fumes or combustion products are inhaled remove from contaminated area. Lay patient down. keep warm and rested. Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.

Transport to hospital, or doctor.

NOTES TO PHYSICIAN

Chronic exposures to cobalt and its compounds result in the so-called "hard metal pneumoconiosis" amongst industrial workers. The lesions consist of nodular conglomerate shadows in the lungs, together with peribranchial infiltration. The disease may be reversible. The acute form of the disease resembles a hypersensitivity reaction with malaise, cough and wheezing; the chronic form progresses to core pulmonale. Chronic therapeutic administration may cause goiter and reduced thyroid activity. An allergic dermatitis, usually confined to elbow flexures, the ankles and sides of the neck, has been described. Cobalt cardiomyopathy may be diagnosed early by changes in the final part of the ventricular ECG (repolarization). In the presence of such disturbances, the changes in carbohydrate metabolism (revealed by the glucose test) are of important diagnostic value. Treatment generally consists of a combination of Retable (1 injection per week over 4 weeks) and beta-blockers (average dose 60-80 mg Obsidian/24 hr). Potassium salts and diuretics have also proved useful.

Determinant	Sampling time	Index	Comments
Cobalt in urine	End of shift at end of Work week	15 ug/L	B
Cobalt in blood	End of shift at end of workweek	1 ug/L	B, SQ

B: Background levels occur in specimens collected from subjects NOT exposed

SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

There is no restriction on the type of extinguisher which may be used.

FIRE FIGHTING

Alert Fire Brigade and tell them location and nature of hazard. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or water courses. Use firefighting procedures suitable for surrounding area. Use water delivered as a fine spray to control the fire and cool adjacent area. DO NOT approach containers suspected to be hot. If safe to do so, remove containers from path of fire. Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD

Non combustible.
Not considered to be a significant fire risk.
Decomposes on heating and produces toxic fumes of sulfur oxides (SOx).

FIRE INCOMPATIBILITY

None known.

Personal Protective Equipment

Breathing apparatus.
Gas tight chemical resistant suit.
Limit exposure duration to 1 BA set 30 mins

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES MINOR SPILLS

Clean up all spills immediately. Avoid contact with skin and eyes. Wear impervious gloves and safety glasses.
Use dry clean up procedures and avoid generating dust. Sweep up or vacuum up (consider explosion-proof machines designed to be grounded during storage and use). Place spilled material in clean, dry, sealable, labelled container.

MAJOR SPILLS

Clear area of personnel and move upwind. Alert Fire Brigade and tell them location and nature of hazard. Control personal contact by using protective equipment and dust respirator. Prevent spillage from entering drains, sewers or water courses. Recover product wherever possible. Avoid generating dust. Sweep / shovel up. If required, wet with water to prevent dusting. Put residues in labelled plastic bags or other containers for disposal. Wash area down with large quantity of water and prevent runoff into drains. If contamination of drains or waterways occurs, advise emergency services.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

Life-threatening health effects is:
Cobalt (II) sulfate, heptahydrate 150 mg/m³

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:
cobalt (II) sulfate, heptahydrate 0.25 mg/m³

other than mild, transient adverse effects without perceiving a clearly defined odor is: cobalt (II) sulfate, heptahydrate 0.15 mg/m³

The threshold concentration below which most people will experience no appreciable risk of health effects: cobalt (II) sulfate, heptahydrate 0.05 mg/m³

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs
Very Toxic (T+) >= 0.1% Toxic (T) >= 3.0%

R50	>= 0.25%	Corrosive (C)	>= 5.0%
R51	>= 2.5%		
else	>= 10%		

where percentage is percentage of ingredient found in the mixture

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS

X + X 0 + +

+: May be stored together
O: May be stored together with specific preventions X: Must not be stored together

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

· Limit all unnecessary personal contact.
· Wear protective clothing when risk of exposure occurs.
· Use in a well-ventilated area.
· Avoid contact with incompatible materials.
· When handling, DO NOT eat, drink or smoke.
· Keep containers securely sealed when not in use.
· Avoid physical damage to containers.
· Always wash hands with soap and water after handling.
· Work clothes should be laundered separately.
· Use good occupational work practice.
· Observe manufacturer's storing and handling recommendations.

Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained

SUITABLE CONTAINER

Packaging as recommended by manufacturer.
· Check that containers are clearly labelled.
Multi-ply woven plastic or paper bag with sealed plastic liner
NOTE: Bags should be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.
Plastic drum.
Metal can.
Metal drum.

STORAGE INCOMPATIBILITY

Keep dry.

STORAGE REQUIREMENTS

Keep dry.
· Store in original containers.
Keep containers securely sealed
· Store in a cool, dry, well-ventilated area.
· Store away from incompatible materials and foodstuff containers.
· Protect containers against physical damage and check regularly for leaks.

Observe manufacturer's storing and handling recommendations

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records
Cobalt (II) sulfate, heptahydrate: CAS:10026- 24- 1 CAS:10124- 43- 3+

MATERIAL DATA

Epidemiological studies do not support a link between cobalt and abnormal growths (neoplasms) in humans. In view of the serious effects seen in experimental animals after a relatively short exposure period at 0.1 mg/m3 the recommended TLV-TWA is thought to reduce the significant risk of material impairment of health posed by respiratory disease and pulmonary sensitization which have been shown to occur at higher levels of exposure. The value does not apply generally to cobalt compounds. A significant increase in the risk of lung cancer was reported among workers involved in cobalt production (with concomitant exposure to nickel and arsenic) and hard-metal workers with documented exposure to cobalt -containing dusts. A significant increase in lung cancer risk was reported among workers involved in cobalt production (with concomitant exposure to nickel and arsenic) and hard-metal workers with documented exposure to cobalt-containing dusts. A significant increase in lung cancer risk has been observed in workers whose exposure began more than 20 years previously. A number of single cases of malignant tumors, mostly sarcomas, have been reported at the site, following implant of cobalt-containing orthopedic implants.

PERSONAL PROTECTION

EYE

Safety glasses with side shields; or as required, Chemical goggles. Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59

HANDS/FEET

Impervious gloves. Rubber gloves.
Protective footwear

OTHER

Overalls.
Impervious apron.
Barrier cream.
Eyewash unit

Protection Factor	Half- Face Respirator	Full- Face Respirator	Powered Air Respirator
10 x ES	P1 Air- line*	- -	PAPR- P1 -
50 x ES	Air- line**	P2	PAPR- P2
100 x ES	-	P3	-
		Air- line*	-
100+ x ES	-	Air- line**	PAPR- P3

Negative pressure demand ** - Continuous flow.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

For further information consult your Occupational Health and Safety Advisor

ENGINEERING CONTROLS

Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powered by mutual friction. Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace. If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered. Such protection might consist of particle dust respirators, if necessary, combined with an absorption cartridge: filter respirators with absorption cartridge or canister of the right type: fresh-air hoods or masks Build-up of electrostatic charge on the dust particle, may be prevented by bonding and grounding. Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to efficiently remove the contaminant.

Type of Contaminant:	Air Speed:
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1- 2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5- 10 m/s (500- 2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to currents capture	1: Disturbing room air
2: Contaminants of low toxicity or of nuisance value only	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion control only	4: Small hood- local

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore, the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 4-10 m/s (800-2000 f/min) for extraction of crusher dusts generated 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Pink to red odorless monoclinic, prismatic crystals. Soluble in water, (60.4 g/100 ml in cold water, 67 g/100 ml in hot water). Slightly soluble in methanol, ethanol. On heating dehydrates to the hexahydrate (monoclinic, prismatic crystals) at 41.5 C and to the monohydrate at 71 C. Hygroscopic. Hexahydrate occurs in nature as the mineral bieberite; also available in the anhydrous form.

PHYSICAL PROPERTIES

Solid. Mixes with water.

Molecular Weight: 281.10 (hepta)
Melting Range (°C): 96.8 (hepta)
Solubility in water (g/L): Soluble.
pH (1% solution): Not available
applicable. Volatile Component (%vol): Not applicable.
applicable Relative Vapour Density (air=1): Not applicable.
Lower Explosive Limit (%): Not applicable
applicable Autoignition Temp (°C): Not applicable
State: Divided solid

Boiling Range (°C): 735 (decomposes)
Specific Gravity (water=1): 1.95 (hepta)
pH (as supplied): Not applicable
Vapor Pressure (kPa): Not
Evaporation Rate: Not
Flash Point (°C): Not applicable
Upper Explosive Limit (%): Not
Decomposition Temp (°C): 735

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

Stable under normal storage conditions. Hazardous polymerization will not occur

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS
ACUTE HEALTH EFFECTS

SWALLOWED

Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual. Sulfate salts are poorly absorbed from the gastro-intestinal tract but because of osmotic activity are able to draw water from the lumen to produce diarrhea (purging). Sulfate ion usually has little toxicological potential. Animal test indicates an increase in red blood cells (polycythemia) following the absorption of cobalt salts. [ICI] In toxic doses soluble cobalt salts act locally on the gastro-intestinal tract to produce pain and vomiting. Systemic effects in man include a peculiar vasodilation (flushing) of the face and ears, mild hypotension, rash, tinnitus (ringing in the ears) and nerve deafness. [GOSSELIN, SMITH HODGE: Clinical Toxicology of Commercial Products].

EYE

Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterized by tearing or conjunctival redness (as with windburn).
The dust may produce eye discomfort causing transient smarting, blinking.

SKIN

Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.
The material is not thought to be a skin irritant (i.e. is unlikely to produce irritant dermatitis as described in EC Directives using animal models). Temporary discomfort, however, may result from prolonged dermal exposures. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. Toxic effects may result from skin absorption.

INHALED

The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation, of the material, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress. Health hazards from welding fume containing cobalt are not well documented but there are well-known dangers associated with the processing of the substance by other techniques. Inhalation of the fume may result in shortness of breath, coughing and pneumonitis. Hypersensitivity, involving lung changes, occurs in a small number of workers exposed to the fume; the symptoms disappear after exposure ends. Obliterative bronchiolitis adenomatosis has been produced in guinea pigs receiving intratracheal injections of 10 mg cobalt dust. Intratracheal administration of 12.5 mg/kg caused lethargy and death in rats in 15 minutes to 6 hours.

CHRONIC HEALTH EFFECTS

On the basis, primarily, of animal experiments, concern has been expressed that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment. There exists limited evidence that shows that skin contact with the material is capable either of inducing a sensitization reaction in a significant number of individuals, and/or of producing positive response in experimental animals. Principal routes of exposure are by accidental skin and eye contact and inhalation of generated dusts. Occupational asthma attributed to the inhalation of cobalt powder has been confirmed following bronchial challenge tests. Chest tightness and chronic bronchitis have been recorded in hard-metal workers exposed to cobalt. Chronic exposure to cobalt produces polycythemia (increase in blood hemoglobin), increased production of cells of the bone marrow and thyroid gland, pericardial effusion and damage to the alpha cells of the pancreas. Chronic administration of cobaltous chloride has produced goiter, reduced thyroid activity and lowered synthesis rates and levels of cytochrome P-450, an enzymatic system responsible for chemical detoxification, in the liver. Animals also exhibit an increase in respiration, as well as tremor and convulsion. A toxic nephritis (kidney disease) may also develop. Epidemic cardiomyopathy (heart disease) among heavy beer drinkers in the 1960's in Canada, the USA and Belgium has been attributed to the addition of up to 1.5 ppm of cobalt as a foam restorative and stabilizer. Other factors are probably implicated as therapeutic doses of cobalt, up to 50 mg/day (in the treatment of refractory anemias) do not produce this effect. Inadequate protein or vitamin intake amongst heavy drinkers, or the effects of alcohol in rendering the heart more susceptible to disease may be important. Allergic dermatitis of an erythematous popular type may also occur following occupational exposures and may also have positive skin tests. Cobalt metal dust inhalations by miniature swine resulted in early marked decrease in lung compliance and increases in septal collagen. After a one-week "sensitizing period", followed by a 10-day lapse period, further exposures produced wheezing produced by hypersensitivity reactions. Single and repeated subcutaneous or intramuscular injection of cobalt powder and salts to rats may cause sarcoma at the injection site but evidence for carcinogenicity by any other route of exposure does not exist. A number of single cases of malignant tumors, mostly sarcomas, have been reported at the site of orthopedic implants containing cobalt.

TOXICITY AND IRRITATION

TOXICITY	IRRITATION
as the heptahydrate:	
Oral (rat) LD50: 768 mg/kg	Nil Reported

WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.

Section 12 – ECPLOGICAL INFORMATION

No data for cobalt (II) sulfate, heptahydrate.

Section 13 - DISPOSAL INFORMATION

Recycle wherever possible or consult manufacturer for recycling options.
Consult State Land Waste Management Authority for disposal.
Bury residue in an authorized landfill.
Recycle containers if possible, or dispose of in an authorized landfill.

Section 14 - TRANSPORT INFORMATION

HAZCHEM: None
NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: UN, IATA, IMDG

Section 15 - REGULATORY INFORMATION

REGULATIONS

Cobalt (II) sulfate, heptahydrate (CAS: 10026-24-1) is found on the following regulatory lists; International Agency for Research on Cancer (IARC) Carcinogens International Council of Chemical Associations (ICCA) - High Production Volume List OECD Representative List of High Production Volume (HPV) Chemicals United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances - Table II

Section 16 - OTHER INFORMATION

The information in this SDS is based on sources believed to be reliable but is provided without warranty or guarantee of accuracy or completeness. The supplier makes no representations and disclaims all liability for use or reliance on this information. It is the recipient's responsibility to ensure safe, compliant use of the material for their specific application. Use of the material is at the recipient's own risk. No warranties, including merchantability or fitness for a particular purpose, are expressed or implied.

Update version -IV-