

COBALT (METAL)

GHS Safety Data Sheet

Version No:2.0

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

COBALT

OTHER NAMES

Co, Aquacat, "C.I. 77320", cobalt-59, "Super cobalt"

PRODUCT USE

Used for alloys; manufacture of cobalt salts; in nuclear technology; experimental and cancer research.

SUPPLIER

Company: S D FINE- CHEM LIMITED

Address:

315- 317, T.V. INDUSTRIAL ESTATE,

248, WORLI,

MUMBAI- 400030.INDIA.

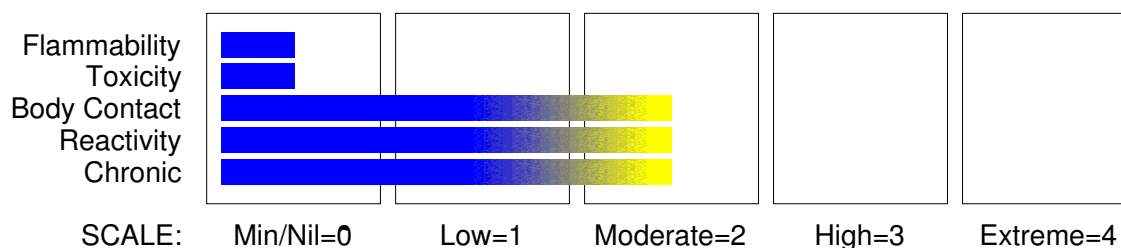
technical@sdfine.com

Telephone: 91- 22- 24959898

Telephone: 91- 22- 24959899

Fax: 91- 22- 24937232

HAZARD RATINGS



Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Chronic Aquatic Hazard Category 4

Eye Irritation Category 2B

Respiratory Sensitizer Category 1

Skin Sensitizer Category 1

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Section 2 - HAZARDS IDENTIFICATION



EMERGENCY OVERVIEW

HAZARD

DANGER

Determined by using GHS criteria:

H320 H334 H317 H413

Causes eye irritation

May cause allergic or asthmatic symptoms or breathing difficulties if inhaled

May cause allergic skin reaction

May cause long lasting harmful effects to aquatic life.

PRECAUTIONARY STATEMENTS

Prevention

In case of inadequate ventilation wear respiratory protection.

Avoid breathing dust/fume/gas/mist/vapours/spray.

Wash hands thoroughly after handling.

Contaminated clothing should not be allowed out of the workplace.

Response

If eye irritation persists, get medical advice/attention.

If skin irritation or rash occurs, seek medical advice/attention.

If experiencing respiratory symptoms call a POISON CENTER or doctor/physician.

IF INHALED: If breathing is difficult, 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.

Specific treatment: refer to Label or MSDS.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Wash contaminated clothing before reuse.

Disposal

Dispose of contents and container in accordance with relevant legislation.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
cobalt	7440-48-4	>97

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Section 4 - FIRST AID MEASURES

SWALLOWED

- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

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 or hair contact occurs:

- Immediately flush body and clothes with large amounts of water, using safety shower if available.
- Quickly remove all contaminated clothing, including footwear.
- Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.
- Transport to hospital, or doctor.

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

Long term exposure to high dust concentrations may cause changes in lung function (i.e. pneumoconiosis) caused by particles less than 0.5 micron penetrating and remaining in the lung. A prime symptom is breathlessness. Lung shadows show on X-ray.

The most efficient clinical treatment of cobalt-induced cardiomyopathy appears to be a combination of Retabolil (one injection per week over four weeks) with beta-blockators in average doses of 60-80 mg Obsidan per 24 hours.

[ILO Encyclopaedia.]

- Chronic exposures to cobalt and its compounds results in the so-called "hard metal pneumoconiosis" amongst industrial workers. The lesions consist of nodular conglomerate shadows in the lungs, together with peribronchial 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 cor pulmonale.

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Section 4 - FIRST AID MEASURES

- 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 (repolarisation). 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 Retabolil (1 injection per week over 4 weeks) and beta-blockers (average dose 60-80 mg Obsidan/24 hr). Potassium salts and diuretics have also proved useful.

BIOLOGICAL EXPOSURE INDEX (BEI)

Determinant	Sampling time	Index	Comments
Cobalt in urine	End of shift at end of workweek	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

FIRE FIGHTING

Alert Fire Brigade and tell them location and nature of hazard.

- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water courses.

Cool fire exposed containers with water spray from a protected location.

DO NOT approach cylinders suspected to be hot.

If safe to do so, remove containers from path of fire.

FIRE/EXPLOSION HAZARD

- Metal powders, while generally regarded as non-combustible, may burn when metal is finely divided and energy input is high.
- DO NOT use water or foam as generation of explosive hydrogen may result.
- May be ignited by friction, heat, sparks or flame.
- Metal dust fires are slow moving but intense and difficult to extinguish.
- Will burn with intense heat.
- DO NOT disturb burning dust. Explosion may result if dust is stirred into a cloud, by providing oxygen to a large surface of hot metal.
- Containers may explode on heating.
- Dusts or fumes may form explosive mixtures with air.
- May REIGNITE after fire is extinguished.
- Gases generated in fire may be poisonous, corrosive or irritating.

FIRE INCOMPATIBILITY

Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result.

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Section 5 - FIRE FIGHTING MEASURES

Personal Protective Equipment

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.
Remove all ignition sources.
Use dry clean up procedures and avoid generating dust.
Vacuum up or sweep up.
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.
· Wear breathing apparatus plus protective gloves.
· Prevent, by any means available, spillage from entering drains or water courses.
No smoking, naked lights or ignition sources. Increase ventilation.
Stop leak if safe to do so.
Avoid generating dust.
Contain spill with sand, earth or vermiculite.
Collect recoverable product into labelled containers for recycling.
Collect residues and seal in labelled drums for disposal.
Wash spill area with large quantities of water.
After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
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 20 mg/m³

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

cobalt 20 mg/m³

other than mild, transient adverse effects without perceiving a clearly defined odour is:

cobalt 0.1 mg/m³

The threshold concentration below which most people will experience no appreciable risk of health effects:

cobalt 0.1 mg/m³

American Industrial Hygiene Association (AIHA)

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Section 6 - ACCIDENTAL RELEASE MEASURES

Ingredients considered according to the following cutoffs

Very Toxic (T+)	$\geq 0.1\%$	Toxic (T)	$\geq 3.0\%$
R50	$\geq 0.25\%$	Corrosive (C)	$\geq 5.0\%$
R51	$\geq 2.5\%$		
else	$\geq 10\%$		

where percentage is percentage of ingredient found in the mixture

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+: May be stored together

O: May be stored together with specific precautions

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

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.

Avoid contact with skin and eyes.

Avoid generating and breathing dust.

Wear protective clothing when risk of exposure occurs.

Avoid smoking, naked lights, heat or ignition sources.

Use in a well-ventilated area.

Avoid contact with incompatible materials.

When handling, DO NOT eat, drink or smoke.

Avoid physical damage to containers.

Always wash hands with soap and water after handling. Work clothes should be laundered separately.

SUITABLE CONTAINER

Packaging as recommended by manufacturer.

· Check that containers are clearly labelled.

Glass container.

Plastic drum.

Polyethylene or polypropylene container.

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.

Metal drum.

STORAGE INCOMPATIBILITY

Segregate from strong oxidizers, ammonium

nitrate, dilute hydrochloric and cold sulfuric acids.

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Section 7 - HANDLING AND STORAGE

STORAGE REQUIREMENTS

Observe manufacturer's storing and handling recommendations.
Keep containers securely sealed.
No smoking, naked lights, heat or ignition sources.
Store in a cool, dry place.
Store in a well-ventilated area.
Store away from incompatible materials.
Protect containers against physical damage.
Check regularly for spills and leaks.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

• cobalt: CAS:7440- 48- 4

EMERGENCY EXPOSURE LIMITS

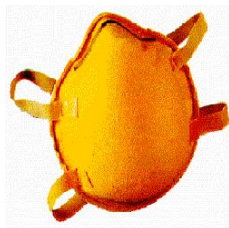
Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
cobalt	20 [Unch]	

MATERIAL DATA

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 has been observed in workers whose exposure began more than 20 years previously. A number of single cases of malignant tumours, mostly sarcomas, have been reported at the site, following implant of cobalt-containing orthopedic implants.

PERSONAL PROTECTION



EYE

- Safety glasses with side shields.
- 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

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

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

Cotton gloves.
Plastic gloves.
Rubber gloves.
Safety footwear.

OTHER

No special equipment needed when handling small quantities.

OTHERWISE:

- Overalls.
- Barrier cream.
- Eyewash unit.

RESPIRATOR

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

Metal dusts must be collected at the source of generation as they are potentially explosive.

- Vacuum cleaners, of flame-proof design, should be used to minimise dust accumulation.
 - Metal spraying and blasting should, where possible, be conducted in separate rooms. This minimises the risk of supplying oxygen, in the form of metal oxides, to potentially reactive finely divided metals such as aluminium, zinc, magnesium or titanium.
 - Work-shops designed for metal spraying should possess smooth walls and a minimum of obstructions, such as ledges, on which dust accumulation is possible.
 - Wet scrubbers are preferable to dry dust collectors.
 - Bag or filter-type collectors should be sited outside the workrooms and be fitted with explosion relief doors.
 - Cyclones should be protected against entry of moisture as reactive metal dusts are capable of spontaneous combustion in humid or partially wetted states.
 - Local exhaust systems must be designed to provide a minimum capture velocity at the fume source, away from the worker, of 0.5 metre/sec.
- Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Type of Contaminant:
welding, brazing fumes (released at relatively
low velocity into moderately still air)

Air Speed:
0.5- 1.0 m/s (100- 200 f/min.)

Within each range the appropriate value depends on:

Lower end of the range

- 1: Room air currents minimal or favourable to capture
- 2: Contaminants of low toxicity or of nuisance value only.
- 3: Intermittent, low production.
- 4: Large hood or large air mass in motion

Upper end of the range

- 1: Disturbing room air currents
- 2: Contaminants of high toxicity
- 3: High production, heavy use
- 4: Small hood- local control only

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 1-2.5 m/s (200-500 f/min.) for extraction of gases discharged 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

Odourless, grey, hard, magnetic, ductile, malleable metal or black powder.

Exists in two allotropic forms: at room temperature, the hexagonal form is more stable than the cubic form but both can exist at room temperature.

Insoluble in water, but soluble in acids.

Brinell hardness: 125

PHYSICAL PROPERTIES

Solid.

Does not mix with water.

Sinks in water.

Molecular Weight: 58.93

Melting Range (°C): 1495

Solubility in water (g/L): Immiscible

pH (1% solution): Not applicable.

Volatile Component (%vol): Not applicable.

Relative Vapour Density (air=1): Not applicable.

Lower Explosive Limit (%): Not applicable

Autoignition Temp (°C): 760 (cloud); 37

State: Divided solid

Boiling Range (°C): 2870

Specific Gravity (water=1): 8.9

pH (as supplied): Not applicable

Vapour Pressure (kPa): Not applicable.

Evaporation Rate: Not applicable

Flash Point (°C): Not applicable

Upper Explosive Limit (%): Not applicable

Decomposition Temp (°C): Not applicable

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Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

Presence of incompatible materials.
Product is considered stable under normal handling conditions.
Hazardous polymerisation will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

Although ingestion is not thought to produce harmful effects (as classified under EC Directives), the material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality rather than those producing morbidity (disease, ill-health). Gastrointestinal tract discomfort may produce nausea and vomiting. In an occupational setting however, ingestion of insignificant quantities is not thought to be cause for concern.

Considered an unlikely route of entry in commercial/industrial environments.

EYE

Limited evidence exists, or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals and/or is expected to produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.

The dust may produce eye discomfort and abrasive eye inflammation.

SKIN

The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

Sensitisation may result in allergic dermatitis responses including rash, itching, hives or swelling of extremities.

Sensitisation may give severe responses to very low levels of exposure, in situations where exposure may occur.

INHALED

The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.

Persons with impaired respiratory function, airway diseases and conditions such as

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Section 11 - TOXICOLOGICAL INFORMATION

emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

CHRONIC HEALTH EFFECTS

Practical evidence shows that inhalation of the material is capable of inducing a sensitisation reaction in a substantial number of individuals at a greater frequency than would be expected from the response of a normal population.

Pulmonary sensitisation, resulting in hyperactive airway dysfunction and pulmonary allergy may be accompanied by fatigue, malaise and aching. Significant symptoms of exposure may persist for extended periods, even after exposure ceases. Symptoms can be activated by a variety of nonspecific environmental stimuli such as automobile exhaust, perfumes and passive smoking.

Practical experience shows that skin contact with the material is capable either of inducing a sensitisation reaction in a substantial number of individuals, and/or of producing a positive response in experimental animals.

Principal routes of exposure are by accidental skin and eye contact and inhalation of generated dusts.

Metallic dusts generated by the industrial process give rise to a number of potential health problems. The larger particles, above 5 micron, are nose and throat irritants. Smaller particles however, may cause lung deterioration. Particles of less than 1.5 micron can be trapped in the lungs and, dependent on the nature of the particle, may give rise to further serious health consequences.

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 polycythaemia (increase in blood haemoglobin), 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 stabiliser. Other factors are probably implicated as therapeutic doses of cobalt, up to 50 mg/day (in the treatment of refractory anaemias) 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 papular 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 "sensitising 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 tumours, mostly sarcomas, have been reported at the site of orthopedic implants containing cobalt.

TOXICITY AND IRRITATION

TOXICITY

Oral (rat) LD50 : 6170 mg/kg

Oral (rabbit) LDLo : 750 mg/kg

IRRITATION

Nil Reported

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Section 11 - TOXICOLOGICAL INFORMATION

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

Section 12 - ECOLOGICAL INFORMATION

No data for cobalt.

Section 13 - DISPOSAL CONSIDERATIONS

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

Section 14 - TRANSPORTATION INFORMATION

HAZCHEM: None

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS:UN, IATA,
IMDG

Section 15 - REGULATORY INFORMATION

REGULATIONS

cobalt (CAS: 7440-48-4) is found on the following regulatory lists;
International Agency for Research on Cancer (IARC) Carcinogens
OECD Representative List of High Production Volume (HPV) Chemicals

Section 16 - OTHER INFORMATION

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

Issue Date: 30-Mar-2018