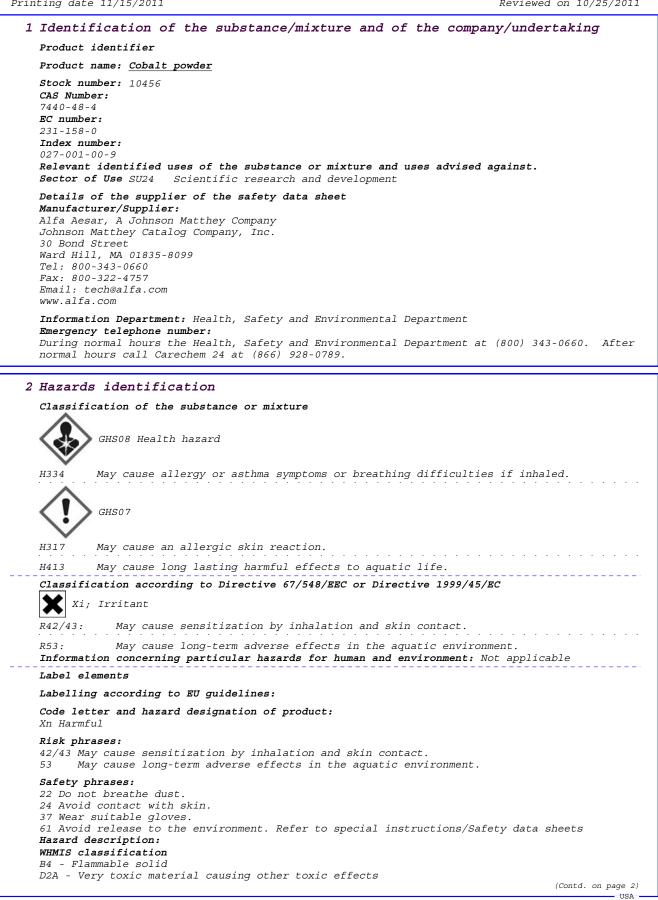
Printing date 11/15/2011

Reviewed on 10/25/2011



Material Safety Data Sheet

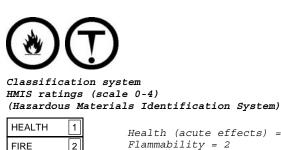
According to OSHA and ANSI

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REACTIVITY 1

Health (acute effects) = 1 Flammability = 2Reactivity = 1

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

3 Composition/information on ingredients

Chemical characterization: Substances CAS# Description: 7440-48-4 Cobalt Identification number(s): EC number: 231-158-0 Index number: 027-001-00-9

4 First aid measures

Description of first aid measures After inhalation Supply fresh air and to be sure call for a doctor. Supply fresh air. If required, provide artificial respiration. Keep patient warm. Seek immediate medical advice. After skin contact Immediately wash with water and soap and rinse thoroughly. Seek immediate medical advice. After eye contact Rinse opened eye for several minutes under running water. Then consult a doctor. After swallowing Seek medical treatment. 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 Firefighting measures

Extinguishing media Suitable extinguishing agents Special powder for metal fires. Do not use water. For safety reasons unsuitable extinguishing agents Water Special hazards arising from the substance or mixture In case of fire, the following can be released: Metal oxide fume Advice for firefighters Protective equipment: Wear self-contained respirator. Wear fully protective impervious suit.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures Wear protective equipment. Keep unprotected persons away. Ensure adequate ventilation Environmental precautions: Do not allow material to be released to the environment without proper governmental permits. Methods and material for containment and cleaning up: Dispose contaminated material as waste according to item 13. Reference to other sections See Section 7 for information on safe handling

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Product name: Cobalt powder

See Section 8 for information on personal protection equipment. See Section 13 for disposal information.

7 Handling and storage

Handling

Precautions for safe handling
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.
Prevent formation of dust.
Information about protection against explosions and fires:
Protect against electrostatic charges.

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: Store away from oxidizing agents. Do not store together with acids. Further information about storage conditions: Keep container tightly sealed. Store in cool, dry conditions in well sealed containers. Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems: Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters

Components with limit values that require monitoring at the workplace: 7440-48-4 Cobalt (100.0%) PEL () 0.1* mg/m³ as Co; *for metal dust & fume, as Co REL () 0.05* mg/m³ inorg. compds.: *metal dust & fume, as Co TLV () 0.02 mg/m³ as Co; BEI Additional information: No data Exposure controls Personal protective equipment General protective and hygienic measures The usual precautionary measures for handling chemicals should be followed. Keep away from foodstuffs, beverages and feed. Remove all soiled and contaminated clothing immediately. Wash hands before breaks and at the end of work. Maintain an ergonomically appropriate working environment. Breathing equipment: Use suitable respirator when high concentrations are present. Protection of hands: Impervious gloves Check protective gloves prior to each use for their proper condition.

Material of gloves The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer. Eye protection: Safety glasses

Body protection: Protective work clothing.

9 Physical and chemical properties

Information on basic physical and chemical General Information	properties
Appearance:	
Form:	Powder
Color:	Black
Odor:	Odorless
Odor threshold:	Not determined.
pH-value:	Not applicable.

(Contd. on page 4)

JSA

USA

Material Safety Data Sheet According to OSHA and ANSI

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Product name: Cobalt powder

	(Contd. of page
Change in condition	
Melting point/Melting range:	1495°C (2723 °F)
Boiling point/Boiling range:	2927°C (5301 °F)
Sublimation temperature / start:	Not determined
Flammability (solid, gaseous)	Not determined.
Ignition temperature:	Not determined
Decomposition temperature:	Not determined
Auto igniting:	Not determined.
Explosion limits:	
Lower:	Not determined
Upper:	Not determined
Vapor pressure at 994°C (1821 °F):	0.0000001 hPa
Density at 20°C (68 °F):	8.92 g/cm³ (74.437 lbs/gal)
Bulk density at 20°C (68 °F):	850 kg/m³
Relative density	Not determined.
Vapor density	Not applicable.
Evaporation rate	Not applicable.
Solubility in / Miscibility with	
Water:	Insoluble
Segregation coefficient (n-octonol/water):	Not determined.
Viscosity:	
dynamic:	Not applicable.
kinematic:	Not applicable.
Other information	No further relevant information available.

10 Stability and reactivity

Reactivity

Chemical stability Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications. Possibility of hazardous reactions No dangerous reactions known Incompatible materials: Acids Oxidizing agents Hazardous decomposition products: Metal oxide fume

11 Toxicological information

Information on toxicological effects Acute toxicity: LD/LC50 values that are relevant for classification: Oral LD50 6171 mg/kg (rat) Primary irritant effect: on the skin: May cause irritation on the eye: Irritating effect. Sensitization: Sensitization possible through inhalation. Sensitization possible through skin contact. Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known. IARC-2B: Possibly carcinogenic to humans: limited evidence in humans in the absence of sufficient evidence in experimental animals. ACGIH A3: Animal carcinogen: Agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) not considered relevant to worker exposure. Available epidemologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence suggests that the agent is not likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure. The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute and/or other multiple dose toxicity data for components in this product. (Contd. on page 5)

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Product name: Cobalt powder

(Contd. of page 4) The Registry of Toxic Effects of Chemical Substances (RTECS) contains reproductive and/or mutation data for components in this product. The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for components in this product.

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: Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system. Do not allow material to be released to the environment without proper governmental permits. 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 Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:

Recommendation: Disposal must be made according to official regulations.

UN-Number	
DOT, ADR, IMDG, IATA	UN3089
UN proper shipping name	
DOT, IMDG, IATA ADR	METAL POWDER, FLAMMABLE, N.O.S. (Cobalt) 3089 METAL POWDER, FLAMMABLE, N.O.S. (Cobalt)
Transport hazard class(es)	
-	
DOT, IMDG, IATA	
Class	4.1 Flammable solids, self-reactive substances and solid desensitised explosives.
Label	4.1
Class	4.1 (F3) Flammable solids, self-reactive
Label	substances and solid desensitised explosives 4.1
Packing group	
DOT, ADR, IMDG, IATA	III
Environmental hazards: Marine pollutant:	No
Special precautions for user	Warning: Flammable solids, self-reactive substances and solid desensitised explosives
Danger code (Kemler):	65

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inting date 11/15/2011	Reviewed 611 10/23/2011
roduct name: Cobalt powder	
	(Contd. of page 5)
Transport in bulk according to Anne MARPOL73/78 and the IBC Code	ex II of Not applicable.
UN "Model Regulation":	UN3089, METAL POWDER, FLAMMABLE, N.O.S. (Cobalt), 4.1, III
15 Regulatory information	
Safety, health and environmental remixture	egulations/legislation specific for the substance or
Product related hazard information	s:
Hazard symbols: Xn Harmful	
Risk phrases: 42/43 May cause sensitization by in 53 May cause long-term adverse o	nhalation and skin contact. effects in the aquatic environment.
Safety phrases: 22 Do not breathe dust. 24 Avoid contact with skin. 37 Wear suitable gloves. 61 Avoid release to the environment	t. Refer to special instructions/Safety data sheets
Substances Control Act Chemical sub This product contains a chemical kn reproductive toxicity.	listed in the U.S. Environmental Protection Agency Toxic bstance Inventory. nown to the state of California to cause cancer or listed on the Canadian Domestic Substances List (DSL).
Information about limitation of use For use only by technically qualify This product is subject to the repo Planning and Community Right to Kno	ied individuals. orting requirements of section 313 of the Emergency
Other regulations, limitations and	
REACH - Pre-registered substances S Chemical safety assessment: A Chem.	ical Safety Assessment has not been carried out.
16 Other information	
them, and should make independent proper use and protect the health without warranty, and any use of th	ion only as a supplement to other information gathered by judgement of suitability of this information to ensure and safety of employees. This information is furnished he product not in conformance with this Material Safety any other product or process, is the responsibility of the
Department issuing MSDS: Health, Sa	
Contact:	afety and Environmental Department.
Zachariah C. Holt Global EHS Manager	afety and Environmental Department.
Zachariah C. Holt Global EHS Manager Abbreviations and acronyms:	
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