SAFETY DATA SHEET



CO-106 products

Section 1. Identification

GHS product identifier	: CO-106 products
Other means of identification	: CO-106-1 (032110), CO-106-2 (032113), CO-106-4 (ZCO106-04), CO-106-8 / 1256F (032162), CO-106-10 (ZCO106-10)
Product type	: Powder.

Relevant identified uses of the substance or mixture and uses advised against Not applicable.

Supplier's details	: Praxair Surface Technologies, Inc. 1555 Main Street Indianapolis, IN 46224 USA 317-240-2650
Emergency telephone	: 317-240-2484 7:00am - 3:30pm ET Mon-Fri

number (with hours of Chemtrec: 1-800-424-9300

operation)

Section 2. Hazards identification

OSHA/HCS status	 This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: CARCINOGENICITY - Category 2

GHS label elements

Hazard pictograms



classified	mechanical irritation of the eyes, skin, nose and throat.	
Hazards not otherwise	Handling and/or processing of this material may generate a dust which can cause	
Disposal	Dispose of contents and container in accordance with all local, regional, national an international regulations.	۱d
Storage	Store locked up.	
Response	IF exposed or concerned: Get medical attention.	
Prevention	Obtain special instructions before use. Do not handle until all safety precautions ha been read and understood. Use personal protective equipment as required.	ave
Precautionary statements		
Hazard statements	Suspected of causing cancer.	
Signal word	Warning	

Section 3. Composition/information on ingredients

Substance/mixture	1	Substance
Other means of identification	:	CO-106-1 (032110), CO-106-2 (032113), CO-106-4 (ZCO106-04), CO-106-8 / 1256F (032162), CO-106-10 (ZCO106-10)

CAS number	: Not available.
Product code	: CO-106 products

Section 3. Composition/information on ingredients

Ingredient name	%	CAS number
CO-106 products	100	-
cobalt	50 - 75	7440-48-4
chromium	20 - 50	7440-47-3
tungsten	1 - 5	7440-33-7
carbon	1 - 5	7440-44-0
silicon	1 - 5	7440-21-3

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	 Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
Inhalation	: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Skin contact	 Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Ingestion	: Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/e	ffects, acute and delayed
Potential acute health effect	its
Eye contact	: Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.
Inhalation	: Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.
Skin contact	: No known significant effects or critical hazards.
Ingestion	: No known significant effects or critical hazards.
<u>Over-exposure signs/symp</u>	<u>toms</u>
Eye contact	: Adverse symptoms may include the following: irritation redness
Inhalation	: Adverse symptoms may include the following: respiratory tract irritation coughing
Skin contact	: No specific data.
Ingestion	: No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Section 4. First aid measures

Notes to physician	 Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments	: No specific treatment.
Protection of first-aiders	 No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media	
Suitable extinguishing media	: Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	: None known.
Specific hazards arising from the chemical	: No specific fire or explosion hazard.
Hazardous thermal decomposition products	: Decomposition products may include the following materials: carbon dioxide carbon monoxide metal oxide/oxides
Special protective actions for fire-fighters	 Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protect	tiv	e equipment and emergency procedures
For non-emergency personnel	:	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders	:	If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
Environmental precautions	:	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
Methods and materials for co	ont	ainment and cleaning up
Small spill	:	Move containers from spill area. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Dispose of via a licensed waste disposal contractor.
Large spill	:	Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

	-	
Precautions for safe handling		
Protective measures	Put on appropriate personal protective equipment (see Section 8). Avoid explotain special instructions before use. Do not handle until all safety precaution been read and understood. Do not get in eyes or on skin or clothing. Do not void breathing dust. If during normal use the material presents a respiratory use only with adequate ventilation or wear appropriate respirator. Keep in the container or an approved alternative made from a compatible material, kept tillosed when not in use. Empty containers retain product residue and can be to not reuse container.	ons have ingest. / hazard, e original ightly
Advice on general occupational hygiene	Eating, drinking and smoking should be prohibited in areas where this materia andled, stored and processed. Workers should wash hands and face before irinking and smoking. Remove contaminated clothing and protective equipm entering eating areas. See also Section 8 for additional information on hygier neasures.	e eating, ient before
Conditions for safe storage, including any incompatibilities	Store in accordance with local regulations. Store in original container protecter lirect sunlight in a dry, cool and well-ventilated area, away from incompatible see Section 10) and food and drink. Store locked up. Keep container tightly and sealed until ready for use. Containers that have been opened must be car esealed and kept upright to prevent leakage. Do not store in unlabeled container Jse appropriate containment to avoid environmental contamination.	materials closed arefully
Storage	Store in accordance with local regulations. Store in original container protect lirect sunlight in a dry, cool and well-ventilated area, away from incompatible see Section 10) and food and drink. Keep container tightly closed and seale eady for use. Containers that have been opened must be carefully resealed upright to prevent leakage. Do not store in unlabeled containers. Use appropro- containment to avoid environmental contamination.	materials d until and kept

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

OSHA PEL 1989 (United States, 3/1989). Notes: as Co TWA: 0.05 mg/m ³ , (as Co) 8 hours. OSHA PEL (United States, 2/2013). Notes: as Co TWA: 0.1 mg/m ³ , (as Co) 8 hours. NIOSH REL (United States, 10/2013). Notes:
as Co TWA: 0.05 mg/m³, (as Co) 10 hours. Form: Dust and fumes ACGIH TLV (United States, 6/2013). Notes:
as Co TWA: 0.02 mg/m ³ , (as Co) 8 hours. Form: Inorganic ACGIH TLV (United States, 6/2013). TWA: 0.5 mg/m ³ , (measured as Cr) 8 hours. OSHA PEL 1989 (United States, 3/1989). TWA: 1 mg/m ³ 8 hours. NIOSH REL (United States, 10/2013).
TWA: 0.5 mg/m ³ 8 hours. OSHA PEL (United States, 2/2013). TWA: 1 mg/m ³ , (as Cr) 8 hours. ACGIH TLV (United States, 6/2013). TWA: 5 mg/m ³ , (as W) 8 hours. STEL: 10 mg/m ³ , (as W) 15 minutes. NIOSH REL (United States, 10/2013). TWA: 5 mg/m ³ , (as W) 10 hours.

Section 8. Exposure controls/personal protection

alliaan	STEL: 10 mg/m ³ , (as W) 15 minutes.
silicon	OSHA PEL 1989 (United States, 3/1989).
	TWA: 5 mg/m ³ 8 hours. Form: Respirable
	fraction
	TWA: 10 mg/m ³ 8 hours. Form: Total dust
	NIOSH REL (United States, 10/2013).
	TWA: 5 mg/m ³ 10 hours. Form: Respirable
	fraction
	TWA: 10 mg/m ³ 10 hours. Form: Total
	OSHA PEL (United States, 2/2013).
	TWA: 5 mg/m ³ 8 hours. Form: Respirable
	fraction
	TWA: 15 mg/m ³ 8 hours. Form: Total dust

Appropriate engineering controls	: Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
Environmental exposure controls	: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures	
	Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
Eye/face protection :	Safety eyewear complying with an approved standard should be used to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields. If operating conditions cause high dust concentrations to be produced, use dust goggles.
Skin protection	
Hand protection :	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
Body protection :	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection :	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection :	Use a properly fitted, particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance	
Physical state	: Solid. [Powder.]
Color	: Gray.
Odor	: Odorless
Odor threshold	: Not available.
рН	: Not available.
Melting point	: 1493 to 1900°C (2719.4 to 3452°F)
Boiling point	: Not available.
Flash point	: Not available.
Evaporation rate	: Not available.
Flammability (solid, gas)	: Not available.
Lower and upper explosive (flammable) limits	: Not available.
VOC content	: 0 lbs/gal (0 g/l)
Vapor pressure	: Not available.
Vapor density	: Not available.
Relative density	: Not available.
Solubility	: Insoluble in the following materials: cold water and hot water.
Partition coefficient: n- octanol/water	: Not available.
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
Viscosity	: Not available.

Section 10. Stability and reactivity

Reactivity	No specific test data related to reactivity available for this product or its ingredients.	
Chemical stability	: The product is stable.	
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.	
Conditions to avoid	: No specific data.	
Incompatible materials	: No specific data.	
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.	

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity				
Product/ingredient name	Result	Species	Dose	Exposure
silicon	LD50 Oral	Rat	3160 mg/kg	-

Irritation/Corrosion

Section 11. Toxicological information

Product/ingredient name	Result	Species	Score	Exposure	Observation
tungsten	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
silicon	Eyes - Mild irritant	Rabbit	-	3 milligrams	-

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
cobalt chromium	-	2B 3	-
		-	

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure	: Not available.	
Potential acute health effects		
Eye contact	: Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.	
Inhalation	: Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.	
Skin contact	: No known significant effects or critical hazards.	
Ingestion	: No known significant effects or critical hazards.	
Symptoms related to the physical, chemical and toxicological characteristics		

Eye contact	: Adverse symptoms may include the following: irritation redness
Inhalation	: Adverse symptoms may include the following: respiratory tract irritation coughing
Skin contact	: No specific data.
Ingestion	: No specific data.

<u>Delayed and immediate effects and also chronic effects from short and long term exposure</u> <u>Short term exposure</u>

Section 11. Toxicological information

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Potential immediate effects	: Not available.
Potential delayed effects	: Not available.
Long term exposure	
Potential immediate effects	: Not available.
Potential delayed effects	: Not available.
Potential chronic health eff	ects
Not available.	
General	: Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.
Carcinogenicity	: Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral	33180 mg/kg

Section 12. Ecological information

Toxicity Product/ingredient name Result **Species Exposure** Acute LC50 4400 µg/l 48 hours cobalt Daphnia - Daphnia magna Acute LC50 3.4 mg/l Fresh water Fish - Pimephales promelas 96 hours chromium Acute EC50 0.2 ppm Marine water Algae - Bacillariophyta 72 hours Acute EC50 5 ppm Marine water 4 days Algae - Macrocystis pyrifera -Young Acute EC50 35000 µg/l Fresh water Aquatic plants - Lemna minor 4 days Acute LC50 45 µg/l Fresh water 48 hours Crustaceans - Ceriodaphnia reticulata Acute LC50 22 µg/l Fresh water Daphnia - Daphnia magna 48 hours Acute LC50 13.9 ppm Fresh water Fish - Anguilla rostrata 96 hours Chronic NOEC 50 mg/l Marine water Algae - Glenodinium halli 72 hours Chronic NOEC 0.19 µg/l Fresh water Fish - Cyprinus carpio 4 weeks

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	LogPow	BCF	Potential
cobalt	-	15600	high
silicon	57 to 77	-	high

Mobility in soil

Soil/water partition coefficient (Koc)

: Not available.

Section 12. Ecological information

Other adverse effects

: No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	Mexico Classification	ADR/RID	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-	-	-	-
Transport hazard class(es)	-	-	-	-	-	-
Packing group	-	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.	No.
Additional information	Reportable quantity 14285.7 lbs / 6485.7 kg Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.	-	-	-		-

Special precautions for user : Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Section 14. Transport information

Transport in bulk according : Not available. to Annex II of MARPOL 73/78 and the IBC Code

Section 15. Regulatory information

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U.S. Federal regulations	: TSCA 8(a) PAIR: tungsten	
	TSCA 8(a) CDR Exempt/Partial exemption: Not determined	
	United States inventory (TSCA 8b): All components are listed or exempted.	
	Clean Water Act (CWA) 307: chromium	
Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)	: Listed	
Clean Air Act Section 602 Class I Substances	: Not listed	
Clean Air Act Section 602 Class II Substances	: Not listed	
DEA List I Chemicals (Precursor Chemicals)	: Not listed	
DEA List II Chemicals (Essential Chemicals)	: Not listed	
SARA 302/304		
Composition/information	<u>en ingredients</u>	

No products were found.

SARA 304 RQ	: Not applicable.
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SARA 311/312

Classification : Delayed (chronic) health hazard

Composition/information on ingredients

Name	%	hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
CO-106 products	100	No.	No.	No.	No.	Yes.
cobalt	50 - 75	No.	No.	No.	No.	Yes.
tungsten	1 - 5	No.	No.	No.	Yes.	No.
silicon	1 - 5	No.	No.	No.	Yes.	No.

<u>SARA 313</u>

	Product name	CAS number	%
Form R - Reporting requirements			50 - 75 20 - 50
Supplier notification			50 - 75 20 - 50

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

State regulations	
Massachusetts	 The following components are listed: COBALT; CHROMIUM; TUNGSTEN; SILICON DUST
New York	: The following components are listed: Chromium
New Jersey	: The following components are listed: COBALT; CHROMIUM; TUNGSTEN; SILICON
Pennsylvania	 The following components are listed: COBALT FUME; CHROMIUM; TUNGSTEN; SILICON

Section 15. Regulatory information

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Ingredient name		Canc	;er	Reproducti	ve	No significant risk level	Maximum acceptable dosage level
cobalt		Yes.		No.		No.	No.
Canada inventory	:	All components	are li	sted or exempte	d.	-	
International regulations							
International lists	-	China inventor Japan inventor Korea inventor Malaysia Inven New Zealand In Philippines inv	ry (IE ry: No ry: All ntory nvent vento	CSC): All compo ot determined. components are (EHS Register): tory of Chemica	e listed Not d Not d Sompo	determined. ZIoC) : All components onents are listed or exe	d. s are listed or exempted
Chemical Weapons Convention List Schedule I Chemicals	:	Not listed					
Chemical Weapons Convention List Schedule Il Chemicals	:	Not listed					
Chemical Weapons Convention List Schedule III Chemicals	:	Not listed					

Section 16. Other information

History

Date of printing	: 5/19/2014.
Date of issue/Date of	: 5/19/2014.
revision	

Key to abbreviations	 ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = International Air Transport Association IBC = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) UN = United Nations
References	: Not available.

References

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.