CLAD CORPORATION

TAKEFU SPECIAL STEEL CO., LTD.

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Safety Data Sheet

1. Identification of the product and of the company

Product name	: VG10
Manufacture's name	: Takefu Special Steel Co.,LTD.
Address	: 21-2-1, Shiromaru-cho, Echizen City, Fukui, Japan 9150827
Responsible department	: Engineering
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Website	: http://www.e-tokko.com/contact.htm

＊Please contact us from the inquiry form on our website or directly to the sales representatives if you have any inquiries.

2. Hazard identification

Classification according to GHS **Hazards shown not below are "Not classified", or "Excluded".**

Human health hazardousness

Respiratory Sensitization	Category 1
Skin Sensitization	Category 1
Carcinogenicity	Category 2
Reproduction toxicity	Category 2
Specific Target Organ/ Systemic Toxicity (Single Exposure) (Respiratory irritation)	Category 3
Specific Target Organ/ Systemic Toxicity (Repeated Exposure) (Respiration apparatus)	Category 1

Environmental hazards

Aquatic environmental hazards	Category 4

Labelling (GHS)

Hazard pictograms

Warning

Utmost important hazard

Inhaling dusts/fumes of cobalt may cause a carcinogenic health damage.

Toxicological Information

Grinding scraps, dusts or powders may cause a natural ignition when dried or mixed with oils
Skin/eye inflammations may be caused by skin/eye contacts to the scraps/durst/powders.
A damage of pneumoconiosis may be caused by the dust inhalations.
External wounds may be caused by touching products.

Precautions

Use products on the bases of understanding SDS.
Do not inhale any dusts, fumes, gasses, mists, or vapors.
Do not use this products when eating or smoking.
Prevent from exposure with the usages of a protective equipment or a fan.
Wash hands after handling the products.

3. Composition and Information on Ingredients

Classification of single or mixed goods: Excluded (Mold goods)

Chemical Composition Elements are only shown according to SDS

Element	Abbr.	CAS No.*1)	Specification (mass %)	GHS*2) No.	Official Gazette No.		Notes
					PRTR*3)	ISHAL*4)	
Manganese	Mn	7439-96-5	≦0.50	200	Not applicable	Not applicable	PRTR:below threshold value ISHA:below threshold value
Nickel	Ni	7440-02-0	≦0.50	169	Not applicable	Table # 9-418	PRTR:below threshold value ISHA: correspond
Chromium	Cr	7440-47-3	15	108	1-87	Table #9-142	PRTR: correspond ISHA: correspond
Cobalt	Co	7440-48-4	1.4	119	1-132	Table #9-172	PRTR: correspond ISHA: correspond
Molybdenum	Mo	7439-98-7	1.0	215	1-453	Table #9-603	PRTR: correspond ISHA: correspond

＊The details of the chemical compositions of the products will be provided on Material Certificate.

＊The closed information of chemical compositions of some products will be provided after having an official non-disclosure agreement

＊1 CAS No. : Chemical Abstract Service Number
＊2 GHS : Globally Harmonized System of Classification and Labelling of Chemicals
＊3 PRTR : Pollutant Release and Transfer Register Law
＊4 ISHL : Industrial Safety and Health Law

［Caution］ Dusts of cobalt are officially classified as specified chemical substances on ISHL for the sake of its potential causing carcinogenic damages. Please check your material certificate's cobalt composition result as well as the information given on the following website;

《the Ordinance on Prevention of Hazards》 〔URL〕 http://www.mhlw.go.jp/bunya/roudoukijun/anzeneisei48/index.html

<u><In case "more than 1 % cobalt" are included></u>

This proves alloys/ sintered compacts are chemically steady, however, wearing proper protections while handling the products is needed. Depending on the usages of the products, preventions following the law are necessary. The law is ruled by the Labor Standards Inspection Office. Please confirm the detailed information there.

<u><In case "less than 1 % cobalt" are included></u>

This informs to include cobalt composition within the specification according to ISHL.

4. First-aid measures

First-aid measures to each case are shown below. Seek medical attention properly even when symptoms are not recognized right after performing first-aid measures. The lessons of the first-aid measures such as artificial respiration/ heart massage are recommended to be taken at Japanese Red Cross Society/ fire stations.

After inhalation:

Move victim to fresh air when feeling unwell after inhaling dusts or fumes caused by grinding or welding.
Put victim at rest.
Seek medical advice immediately. Make sure of having medical attention even if symptoms are not soon recognized.

In case of irregular breathing, contact the doctor.

In case of skin contact:

Wash immediately with plenty of water and soap.
If irritation/inflammation persists, seek medical attention.
In case of contact with heated products, seek immediately medical attention for skin burn.
Do not immediately take off all contaminated clothing if they are attached to skin.
Seek medical advice even when symptoms are not immediately recognized.

In case of eye contact:

Seek medical advice immediately.
In case of persisting eye aches or feeling unwell, seek medical attention.
Do not scratch or close eyes tightly if any substances have eye contact.
Make sure of having medical advice even when symptoms are not immediately recognized.

After ingestion:

Seek medical advice immediately in all cases of doubt.

5. Firefighting measures

Extinguishing compositions:

The product itself is a solid material, which is not combustible. Use a proper extinguishing composition depending on the environment around the fire.

Specified hazards:

Toxic gas can be caused by fire.
Grinding scraps, dusts or powders can cause a natural ignition when dried or mixed with oils
Dusts/ powders combined with air have a possibility of causing a dust explosion.

Specified firefighting measures:

Firefighting should be performed from as windward as possible.

Protection of firefighters;

Extinguish fire from windward and avoid toxic gas.
In case of firefighting, wear fitting protections such as respiratory protection, protective clothing, gloves, and glasses and avoid inhaling and contacting substances directly.

6. Accidental release measures

In case of more than 1 % cobalt included product, depending on the usage, the leaking prevention, following the guidance of Industrial Safety and Health Law, can be necessary as the prevention of the dangers or health impairment caused by specified chemical substances.

Personal precautions, protective equipment and emergency procedures:

No leaking as shipping product condition is a solid metal.
Avoid inhaling and contacting gliding scraps, dusts, fumes, or powders directly by wearing protections according to the situation.
In case of causing fumes, put a mask on as prevention.
Work from windward.

Environmental measures:

Gather scraps, dusts, fumes and powders caused by gliding as quickly as possible. Do not allow them to be discharged into rivers or sewerages.
Do not contaminate the environment.

Gathering and containment measures:

In case of causing scraps, dusts, fumes and powders with gliding, installing local exhaust ventilations is needed as a prevention of spreading dusts and powders according to the regulations.

Prevention for secondary disaster

Gliding dust and powders on floors can be a reason for the danger of sliding/falling. Sweep the floors regularly.

7. Handling and storage

Precautions for safe handling

Technical prevention:

Follow ISHL, the fire laws or any other regarding regulations while at work.

In case of dealing with materials, which include more than 1% cobalt, in some cases of specific usages, as the prevention of health damages following ISHL, installing local exhaust ventilations, choosing an operation chef, and performing a measurement of working environment are necessary.

Avoid inhaling and contacting gliding scraps, dusts, fumes, or powders directly by wearing protections according to the situation.

Do not scratch eyes with hands or arms when/after handling substances.

Local/general ventilation

In case of causing scraps, dusts, fumes and powders with gliding, installing local exhaust ventilations is needed as the prevention of spreading dusts and powders according to the regulations.

In case of more than 1 % cobalt included product, depending on the usage, the leaking prevention, following the guidance of Industrial Safety and Health Law, can be necessary as the prevention of the dangers or health impairment caused by specified chemical substances.

Precaution

Dusts/ powders combined with air have a possibility of causing a dust explosion.

Handling precaution

Toxic gas can be caused on the process of pickling. Wear fitting protective clothing properly and avoid inhaling and contacting substances directly.

Do not smoke or drink while handling.

Wash hands with plenty of water and soap after handling substances.

Storage:

Technical prevention

Install lights and ventilation fans at the storage space of dangerous substances.

Proper conditions of storage

Avoid storing substances with acid and alkali together.

Avoid leaving substances outside.

Give heed to the exclusion of moisture.

Avoid a long-term storage.

8. Exposure controls/ Personal protection

Standard control concentration and Threshold value

(Exposure limit value and Biological exposure indices)

There is no date for alloys (mold goods) available, however, each element component information is shown on the table below.

Element	Abbr.	ACGIH*5) TLV*6)		JAIH*9)
		TWA*7) (mg/m^3)	STEL*8) (mg/m^3)	TLV (mg/m^3)
Manganese	Mn	0.2	Not applicable	0.2
Nickel	Ni	1.5	Not applicable	1
Chromium	Cr	0.5 (Metal)	Not applicable	0.5 (Metal chrome)
Cobalt	Co	0.02	Not applicable	0.05
Molybdenum	Mo	10 (Metal (I)) 3 (Metal (R))	Not applicable	Not applicable

＊5 ACGIH : American Conference of Governmental Industrial Hygienists Inc.
＊6 TLV : Threshold Limit Value
＊7 TWA : Time Weighted Average
＊8 STEL : Short Term Exposure Limit
＊9 JAIH : Japan Association of Industrial Health

Technical prevention for exposures

In case of more than 1 % cobalt included product, depending on the usage, the leaking prevention, following the guidance of Industrial Safety and Health Law, can be necessary as the prevention of the dangers or health impairment caused by specified chemical substances.

Protections:

Respiratory protection:

Use only fitting respiratory protections.

Hand and Leg protection:

Wear fitting protective gloves, shoes, and leg covers.

Eye protection:

Wear closely fitting protective glasses.
Wear goggle type protective glasses if needed.

Skin and Body protection:

Wear a protective helmet, long-sleeved protections and a protective mask if needed.

Sanitation

Wash hands with plenty water and soap after handling.
Inspect protections regularly.

9. Physical and Chemical properties

Appearance/Color	: Solid/ Metal
Odor	: No data
Melting point/Solidifying point	: No data
Flash point	: incombustibility
＊Dusts caused on processing can be flammable and explosive.	
spontaneous ignition temperature	: No data
specific weight （density）	: 7.80
solubility	: Insoluble to water

10. Stability and reactivity

Stability:

Products in solid state are stable.

Toxic gas can be caused by contacting chemical substances such as acid.

Possibility of adverse reactivity:

No available data for alloys (mold goods).

Avoiding condition:

Dusts/ powders combined with air have a possibility of causing a dust explosion.

Reactive chemical hazard:

No available data for alloys (mold goods).

Dangerous decomposition:

No available data for alloys (mold goods).

11. Toxicological information

Acute toxicity

No available data for alloys (mold goods).

Skin corrosivity/irritation

No available data for alloys (mold goods).

Serious eye damage/eye irritation

No available data for alloys (mold goods).

Chromium itself belongs to Category 2B (eye irritation).

Respiratory/Skin Sensitization

Respiratory Sensitization

No available data for alloys (mold goods).

Chromium itself belongs to Category 1(substance possibly causing allergy/asthma/dyspnea thorough inhalation.)

Skin Sensitization

No available data for alloys (mold goods).

Chromium itself belongs to Category 1(substance possibly causing allergic dermoreaction.)
Cobalt itself belongs to Category 1(substance possibly causing allergic dermoreaction.)

Germ-cell mutagenicity

No available data for alloys (mold goods).

Chromium itself belongs to Category 2 (substance possibly causing a heritable mutation to human Germ cells.)

Carcinogenicity

No available data for alloys (mold goods).

Nickel itself belongs to Category 2 (substance having a doubt of carcinogenicity.)
Cobalt itself belongs to Category 2 (substance having a doubt of carcinogenicity.)

Genotoxicity

No available data for alloys (mold goods).

Manganese belongs to Category 1B (substance considered of having genotoxicity.)
Cobalt belongs to Category 2 (substance having a doubt of genotoxicity.)

Specific target organ/systemic toxicity (single exposure)

No available data for alloys (mold goods).

Chromium belongs to Category 2 (possibility of general disabilities) and Category 3 (possibility of the respiratory tract irritation.)
Cobalt belongs to Category 3 (possibility of the respiratory tract irritation.)
Molybdenum belongs to Category 3 (possibility of the respiratory tract irritation.)

Specific target organ/systemic toxicity (repeated exposure)

No available data for alloys (mold goods).

Cobalt belongs to Category 3 (respiratory disabilities by repeated or prolonged exposure.)

Aspiration hazards

No available data for alloys (mold goods).

12. Ecological information

Water environmental acute hazardous

No available data for alloys (mold goods).

Water environmental chronic hazardous

No available data for alloys (mold goods).

Cobalt belongs to Category 3 (possibility of the respiratory tract irritation after a long-term usage.)

13. Disposal considerations

Residual waste:

Dispose properly according to the regarding laws and local regulations.

Leave residual wastes to officially approved industrial waste disposal companies or local governments for a proper disposal.

Share enough information of disposal dangers/harms of residual wastes with the disposal enterprises.
For recyclable materials, recycling is desirable.

Contaminated packaging:

Dispose properly according to the regarding laws and local regulations.

14. Transportation information

International Regulations:

Restriction of Maritime Transportation	**Non-dangerous goods**
Restriction of Airline Transportation	**Non-dangerous goods**

Domestic Regulations:

Restriction of Land Transportation	**Not applicable**
Restriction of Maritime Transportation	**Non-dangerous goods**
Restriction of Airline Transportation	**Non-dangerous goods**

Special safety measure:

Load collapse preventions for dropping, falling, or damages are needed.
Handle carefully not to damage with edges.
Do not enter under suspended load.

15. Regulatory information

Industrial Safety and Health Law (ISHL)

To overview the information regarding to indispensable names showing on Material Certificate, Go back to Chapter 3.

Specified chemical substances　　Chapter 2.　　Cobalt and inorganic compound

Pollutant Release and Transfer Register Law（PRTR）

Go back to Chapter 3 for the information of each chemical composition.

16. Other information

Reference documents

1) Chemical substances general information providing system

〔URL〕http://www.safe.nite.go.jp/japan/sougou/view/TotalSrchInput_jp.faces

2) Japan Association of Industrial Health

Recommendation of Occupational Exposure Limits (2009-2010)

3) ICSC

〔URL〕http://www.nihs.go.jp/ICSC/

4) Ministry of Economy,Trade and Industry

〔URL〕http://www.meti.go.jp/

5) Ministry of Health,Labour and Welfare

〔URL〕http://www.mhlw.go.jp/

《the Ordinance on Prevention of Hazards》

〔URL〕http://www.mhlw.go.jp/bunya/roudoukijun/anzeneisei48/index.html

6) Ministry of the Environment

〔URL〕http://www.env.go.jp/

7) Safety information center

〔URL〕http://www.jaish.gr.jp/index.html

Further remarks:

The details in this safety data sheet describe the safety requirements of our products. The data such as chemical composition and elements on this sheet shows neither the guaranteed number nor guaranteed safety.

The evaluation of hazards is based on our current level of knowledge as well as on international/national regulations, however, it may not always be informative enough as considering of not compiling all the official documents on this earth.

Please handle products carefully as it is possible that other non-described hazards on this safety sheet can be caused.