MET051

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# MATERIAL SAFETY DATA SHEET

## I. PRODUCT IDENTIFICATION

**MANUFACTURER'S NAME:** CLEVELAND TWIST DRILL CO. **TELEPHONE NO.:** (216) 431-3120

**ADDRESS:** P.O. BOX 6656
CLEVELAND, OHIO 44101 **DATE PREPARED:** November, 1985

**TRADE NAME:** (Label Identity): CLEVELAND TWIST DRILL CO. FERROUS CUTTING TOOL PRODUCTS

**CHEMICAL NAME:** (Generic): Ferrous Alloys

**COMMON NAME:** High Speed, Tool & Die, Carbon and Stainless Steels

## II. HAZARDOUS INGREDIENTS

The terms "hazardous" and "hazardous materials" as used within this MSDS should be interpreted as defined by, end in accordance with, the OSHA Hazard Communication Standard (29 CFR Part 1910, 1200) including cited Appendices, Lists, References, etc., all of which are hereby incorporated by reference.

| MATERIAL OR COMPONENT | PERCENT BY WEIGHT | CAS NO. | | OSHA PEL ($Mg/M^3$) | | ACGIH TLV ($Mg/M^3$) | |
|---|---|---|---|---|---|---|---|
| COBALT | 0.0 - 12.5% | 7440-48-4 | | 0.1 | | 0.1 | |
| CHROMIUM | 0.0 - 18.0% | 7440-47-3 | | 1.0 | | .50 | |
| IRON | 60.0 - 99.5% | 1309-37-1 | | 10 | | 5 | |
| MANGANESE | .10 - 2.5% | 7439-96-5 | (Dust) | 5 | (Ceiling) | 5 | (Ceiling) |
| | | | (Fume) | -- | | 1 | |
| MOLYBDENUM | 0.0 - 10.0% | 7439-98-7 | | 15 | | 10 | |
| NICKEL | 0.0 - 16.0% | 7440-02-0 | | 1 | | 1 | |
| VANADIUM | 0.0 - 6.0% | 1314-62-1 | (Dust) | .5 | (Ceiling) | .05 | |
| | | | (Fume) | .1 | (Ceiling) | .05 | |
| TITANIUM | 0.0 - 1.0% | 13463-67-7 | | 15 | | 5 | |
| CARBON | 0.10 - 3.00% | 1333-86-4 | | 3.5 | 5 | 3.5 (As Carbon Black) | |
| TUNGSTEN | 0.0 - 18.0% | 7440-33-7 | | -- | -- | 5 | |
| SILICON | 0.0 - 3.5% | 7440-21-2 | (Dust) | -- | -- | 5.0 | |
| ALUMINUM | 0.0 - 2.0% | 7429-90 | (Dust) | -- | -- | 10 | |
| | | | (Fume) | -- | -- | 5 | |

REFER TO GRADE CHART ATTACHED

## III. PHYSICAL DATA

**BOILING POINT:** 5000°F
**SPECIFIC GRAVITY ($H_2O = 1$):** Approx. 7.8 - 8.2 (60°F)
**VAPOR DENSITY (AIR = 1):** N/A
**% VOLATILES BY VOLUME:** N/A
**APPEARANCE & ODOR:** Various Shapes, Solid, Odorless Metal
**MELTING POINT:** Approx. 2500°F
**VAPOR PRESSURE:** N/A
**SOLUBILITY IN $H_2O$:** Insoluble
**EVAPORATION (BUTYL ACETATE = 1):** N/A

## IV. FIRE AND EXPLOSION DATA

**FLASH POINT:** None **FIRE POINT:** None

## V. HEALTH HAZARD INFORMATION

WE DO NOT CONSIDER THIS PRODUCT IN THE FORM IT IS SOLD TO CONSTITUTE A PHYSICAL HAZARD OR A HEALTH HAZARD. SUBSEQUENT OPERATIONS SUCH AS ABRADING, MELTING, WELDING, CUTTING OR PROCESSING IN ANY OTHER FASHION MAY PRODUCE POTENTIALLY HAZARDOUS DUST OR FUME WHICH CAN BE INHALED, SWALLOWED, OR COME IN CONTACT WITH THE SKIN OR EYES.

| PRIMARY ROUTES OF ENTRY: | EMERGENCY FIRST AID: |
|---|---|
| Inhalation | Remove to fresh air, if condition continues, consult physician. |
| Eye Contact | Flush well with running water to remove particulate. Get medical attention. |
| Skin Contact | Brush off excess dust. Wash area well with soap & water. |
| Ingestion | Seek medical help if large quantities of material have been ingested. |

**EFFECTS OF EXPOSURE:** No toxic effects would be expected from exposure to the solid form of specialty steel. Prolonged, repeated exposure to fumes or dusts generated during heating, cutting, brazing or welding may or may not cause adverse health effects associated with the listed constituents in excess of OSHA permissible exposure limits established in 29 CFR Subpart Z. (See Section II).

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## V. HEALTH HAZARD INFORMATION (CONT'D)

**EXPOSURE LIMITS:** Section II lists specific ingredients and permissible exposure limits.

**IMPORTANT:** Determine actual exposure by industrial hygiene monitoring.

**POSSIBLE SIGNS AND SYMPTOMS OF EXPOSURE TO DUST, WELDING FUME AND GASES:**

**SHORT TERM EXPOSURE:** Metallic taste; nausea, tightness of chest; fever; irritation of eyes, nose, throat and skin; loss of consciousness/death due to welding gases or lack of oxygen.

**LONG TERM EXPOSURE:** There are no adverse effects from the products in their solid form. Adverse effects may or may not result from long-term (chronic) exposure to dust, fume, gases, etc. that occur by way of subsequent operations on the product. Some studies would associate one (or more) of the constituents (per Section II) with the potential for neurologic, pulmonary, respiratory, skin or other disease. Chromium, cobalt and nickel in various chemical compounds have been identified as suspect human carcinogens by the I.A.R.C., N.T.P. Annual Report. We believe there are no reliable scientific studies which show that workers exposed to operations upon our alloys suffer increased incidence of lung cancer or other disease because of their exposure to the forms of chromium, nickel or other elements in our products.

AGGRAVATION OF PREEXISTING RESPIRATORY OR ALLERGIC CONDITIONS MAY OCCUR IN SOME WORKERS.

## VI. REACTIVITY DATA

| | |
|---|---|
| **STABILITY:** | Chemically Stable |
| **INCOMPATIBILITY:** | Reacts with Strong Acids to Generate Hydrogen Gas |
| **HAZARDOUS DECOMPOSITION PRODUCTS:** | Metallic Oxides |

## VII. SPILL OR LEAK PROCEDURES

**STEPS TO BE TAKEN IN CASE OF RELEASE OR SPILL:** N/A

**WASTE DISPOSAL METHOD:** Solids - Sale as Scrap for Reuse
Dust, etc. - Follow Federal, State and Local Regulations Regarding Disposal

## VIII. SPECIAL PROTECTION INFORMATION

**VENTILATION REQUIREMENTS:** General - Recommended (To keep airborne concentration of dust and fumes below ACGIH TLV's)
Local - As Required

**PERSONAL PROTECTIVE EQUIPMENT:**

| | |
|---|---|
| Respiratory Protection: | If Fumes, misting or dust condition occurs and T.L.V. as indicated in Section II is exceeded, provide NIOSH approved respirators. |
| Eye Protection: | Recommend approved safety glasses or goggles when working with dusty material. |
| Gloves: | As Required |
| Other Clothing or Equipment: | As Required |

## IX. SPECIAL PRECAUTIONS

USE GOOD HOUSEKEEPING PRACTICES TO PREVENT ACCUMULATIONS OF DUSTS AND TO KEEP AIRBORNE DUST CONCENTRATIONS AT A MINIMUM.

THIS MATERIAL IS POTENTIALLY CONTAMINATED WITH COATINGS SUCH AS OILS FOR PRESERVATIVES AND OTHER CONTAMINANTS. IF THE MATERIAL IS CONTAMINATED, SPECIAL PRECAUTIONS (SUCH AS PROCESS CONTROL AND PERSONAL PROTECTIVE EQUIPMENT APPROPRIATE TO THE NATURE OF THE SUSPECTED CONTAMINANTS SHOULD BE TAKEN TO AVOID RESULTING EXPOSURES WHEN HANDLING, CUTTING (THERMAL OR MECHANICAL) AND/OR HEATING OR MELTING.

While the information set forth on this material safety data sheet is believed to be accurate, as of the effective date, Cleveland Twist Drill Co. makes no representations regarding the accuracy or completeness of the information and assumes no liability for any loss, damage, or injury of any kind which may result from or arise out of the use or reliance on the information by any person.

N/A = NOT APPLICABLE

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# MATERIAL SAFETY DATA SHEET

**COMPANY NAME:** CLEVELAND TWIST DRILL CO.
**Address:** P.O. BOX 6656
CLEVELAND, OHIO 44101

**Telephone No.:** 216-431-3120

**Chemical Name:** Cemented Carbide Product with Cobalt binder.

**Trade Name and Synonyms:** All Cleveland Carbide Grades

**Chemical Family:** Refractory Metal Carbide

**Molecular Weight:** N/A

## PHYSICAL DATA

| | | | |
|---|---|---|---|
| **Appearance and Odor:** | Oark Gray Metal/No Odor | | |
| **Boiling Point:** | N/A | **Specific Gravity ($H_2O = 1$):** | 11.0 to 15.5 |
| **Vapor Pressure (mm Hg):** | N/A | **Percent Volatile by Volume:** | 0 |
| **Vapor Density (Air = 1):** | N/A | **Evaporation rate:** | N/A |
| **Solubility in Water:** | Insoluble | **How Best Monitored:** | Air Sample |

## HAZARDOUS INGREDIENTS

| Material | Percent by Weight | | OSHA PEL | ACGIH TLV |
|---|---|---|---|---|
| Tungsten Carbide (limits for Tungsten dust) | 41 - 97% | * | ---- | 5 mg/m$^3$ |
| Cobalt | 3 - 30% | * | 0.1 mg/m$^3$ | 0.1 mg/m$^3$ |
| Tantalum Carbide (limits for Tantalum dust) | 0.0 - 16.5% | * | 5 mg/m$^3$ | 5 mg/m$^3$ |
| Chromium Carbide (limits for Chromium (+3) dust) | 0.0 - 5.1% | * | 1 mg/m$^3$ | 0.5 mg/m$^3$ |
| Chromium (+3) | 0.0 - 4.5% | * | 1 mg/m$^3$ | 0.5 mg/m$^3$ |
| Titanium Carbide (limits for Titanium dust) | 0.0 - 16.5% | * | ---- | 5 mg/m$^3$ |

*Depends on grade specifications

## HEALTH HAZARD DATA

**Routes of Exposure:**
Grinding cemented carbide product will produce dust of potentially hazardous ingredients which can be inhaled, swallowed or come in contact with the skin or eyes.

**Effects of Overexposure:**

Inhalation - Dust from grinding can cause irritation of the nose and throat. It also has the potential for causing transient or permanent respiratory disease, including occupational asthma and interstitial fibrosis, in a small percentage of exposed individuals. It is reported that cobalt dust is the most probable cause of such respiratory diseases. Symptoms include productive cough, wheezing, shortness of breath, chest tightness and weight loss. Interstitial fibrosis (lung scarring) can lead to permanent disability or death. Certain pulmonary conditions may be aggravated by exposure.

Skin Contact - Can cause irritation or an allergic skin rash due to cobalt sensitization. Certain skin conditions, such as dry skin, may be aggravated by exposure.

Eye Contact - Can cause irritation.

Ingestion - Reports outside the industry suggest that ingestion of significant amounts of cobalt has the potential for causing blood, heart and other organ problems.

**Emergency and First Aid Procedures:** Applicable for dusts or mists

Inhalation - If symptoms of pulmonary involvement develop (coughing, wheezing, shortness of breath, etc.), remove from exposure and seek medical attention.

Skin Contact - If irritation or rash occurs, thoroughly wash affected area with soap and water and isolate from exposure. If irritation or rash persists, seek medical attention.

Eye Contact - If irritation occurs, flush with copious amounts of water. If irritation persists, seek medical attention.

Ingestion - If substantial quantities are swallowed, dilute with a large amount of water, induce vomiting and seek medical attention.

**Carcinogenic Assessment (NTP Annual Report, IARC Monographs, other):**
None of the components of this material have been identified as known or suspected carcinogens by NTP, IARC or OSHA.

## FIRE AND EXPLOSION HAZARD DATA

**Flash Point:** N/A **Test Method Used:** --- **Flammable Limits:** N/A **LEL:** --- **UEL:** ---

Hard Cemented Carbide Product is not a fire hazard. Dusts generated in grinding operations may ignite if allowed to accumulate, and subjected to an ignition source.

**Extinguishing Media:** For powder fires use dry sand, dry dolomite, ABC type fire extinguisher, or flood with water.

**Special Fire Fighting Procedures:** For a powder fire confined to a small area, use a respirator approved for toxic dusts and fumes. For a large fire, fire fighters should use self-contained breathing apparatus.

**Unusual Fire and Explosion Hazards:** Dusts may present a fire or explosion hazard under rare favoring conditions of particle size, dispersion and strong ignition source. However, this is not expected to be a problem under normal handling conditions.

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**CHEMICAL NAME:** **Cemented Carbide Product with Cobalt binder.**

## REACTIVITY DATA

**Stability:** **Unstable**

**Stable** X

**Conditions to Avoid:** N/A

**Incompatibility:** Contact of dust with strong oxidizers may cause fire or explosions.

**Materials to Avoid:** Strong acids

**Hazardous Decomposition Products:** None

**Hazardous Polymerization:** **May Occur**

**Will Not Occur** X

**Conditions to Avoid:** N/A

## SPILL OR LEAK PROCEDURES

**Steps to be Taken in Case Material is Released or Spilled:** Ventilate area of spill. Clean up using methods which avoid dust generation such as vacuum (with appropriate filter to prevent airborne dust levels which exceed the PEL or TLV), wet dust mop or wet clean-up. If airborne dust is generated, use an appropriate NIOSH approved respirator.

**Waste Disposal Method:** Dispose of in accordance with appropriate government regulations. May be sold as scrap for reclaim.

## SPECIAL PROTECTION INFORMATION

**Respiratory Protection:** Use an appropriate NIOSH approved respirstor if airborne dust concentrations exceed the appropriate PEL or TLV. All appropriate requirements set forth in 29 CFR 1910.134 should be met.

**Ventilation:** Use local exhaust ventilation which is adequate to limit personal exposure to airborne dust to levels which do not exceed the PEL or TLV. If such equipment is not available use respirators as specified above.

**Protective Gloves:** Protective Gloves or Barrier cream are recommended when contact with dust or mist is likely. Prior to applying the Barrier cream or use of protective gloves, wash thoroughly.

**Eye Protection:** Safety glasses with side shields or goggles are recommended.

**Other Protective Equipment:** N/A

## SPECIAL PRECAUTIONS

**Precautions to be taken in handling and storage:** Maintain good housekeeping procedures to prevent dust accumulation during grinding. Avoid dust inhalation and direct skin contact with dust.

**Other Precautions:** Clean up using methods which avoid dust generation such as vacuum (with appropriate filter to prevent airborne dust levels which exceed the PEL or TLV), wet dust mop or wet clean-up. If airborne dust is generated, use an appropriate NIOSH approved respirator.

Wash hands thoroughly after handling, before eating or smoking. Wash exposed skin at the end of work shift. Do not shake clothing, rags or other items to remove dust. Dust should be removed by washing or vacuuming (with appropriate filters) the clothing, rags, or other items.

Periodic medical examinations are recommended for individuals regularly exposed to dust or mist.


**In case of questions please call:** George Kiss
**Company Name:** Cleveland Twist Drill Co.
**Title of Individual:** Div. Quality Assurance Mgr.
**Telephone Number:** 216-431-3120


**Issue Date:** 11/25/85

**Supersedes:** N/A


Although Cleveland Twist Drill Co. has attempted to provide current and accurate information herein, Cleveland Twist Drill Co. makes no representations regarding the accuracy or completeness of the information and assumes no liability for any loss, damage, injury of any kind which may result from or arise out of the use of or reliance on the information by any person.

# CLEVELAND TWIST DRILL
## GRADE CHART

The following numbers represent weight percentage of the elements.

| AISI/GRADE | C | Si | Mn | W | Cr | V | Mo | Co | Ni | Cu | Pl | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M-1 | .83 | .45 | .30 | 2.00 | 4.00 | 1.30 | 9.20 | --- | .25 | .20 | --- | |
| M-2 | .96 | .45 | .40 | 6.75 | 4.40 | 2.05 | 5.25 | --- | .20 | .20 | --- | |
| M-3 | 1.25 | .45 | .40 | 6.75 | 4.50 | 3.25 | 6.50 | --- | .25 | .20 | --- | |
| M-4 | 1.40 | .45 | .40 | 6.50 | 4.75 | 4.50 | 5.50 | --- | .25 | .20 | --- | |
| M-7 | 1.05 | .45 | .30 | 2.00 | 4.00 | 2.20 | 9.10 | --- | .25 | .20 | --- | |
| M-33 | .95 | .55 | .35 | 2.10 | 4.00 | 1.45 | 9.50 | 8.00 | .25 | .20 | --- | |
| M-42 | 1.10 | .55 | .35 | 2.00 | 4.00 | 1.30 | 9.80 | 8.75 | .25 | .20 | --- | |
| M-46 | 1.30 | .65 | .35 | 2.20 | 4.20 | 3.10 | 8.50 | 8.80 | .25 | .20 | --- | |
| M-52 | .90 | .60 | .30 | 1.30 | 4.20 | 2.05 | 4.80 | ---- | .25 | .20 | --- | |
| T-15 | 1.60 | .40 | .40 | 12.75 | 4.75 | 5.25 | .75 | 5.25 | .30 | .25 | --- | |
| Rex 45-S | 1.30 | .50 | .40 | 6.25 | 4.15 | 3.05 | 5.00 | 8.40 | .30 | .25 | --- | |
| D-2 | 1.60 | .60 | .60 | ----- | 13.00 | 1.10 | 1.20 | 1.00 | .30 | .25 | --- | |
| D-3 | 2.35 | .60 | .60 | 1.00 | 13.50 | 1.00 | ---- | ---- | ----- | ---- | --- | |
| W-1 | 1.25 | .25 | .25 | ----- | ----- | ---- | ---- | ---- | ----- | ---- | --- | |
| W-2 | 1.25 | .25 | .25 | ----- | ----- | .25 | ---- | ---- | ----- | ---- | --- | |
| S-5 | .65 | 2.25 | 1.00 | ----- | .35 | .35 | 1.35 | ---- | ----- | ---- | --- | |
| L-6 | .75 | .50 | .80 | ----- | 1.20 | ---- | .50 | ---- | 2.00 | ---- | --- | |
| 1018 | .20 | ---- | .90 | ----- | ----- | ---- | ---- | ---- | ----- | ---- | --- | |
| 1026 | .28 | ---- | .90 | ----- | ----- | ---- | ---- | ---- | ----- | ---- | --- | |
| 1045 | .50 | .35 | .90 | ----- | ----- | ---- | ---- | ---- | ----- | ---- | --- | |
| 10L50 | .55 | ---- | .90 | ----- | ----- | ---- | ---- | ---- | ----- | ---- | .35 | |
| 10L60 | .60 | ---- | .90 | ----- | ----- | ---- | ---- | ---- | ----- | ---- | .35 | |
| 1070 | .76 | ---- | .90 | ----- | ----- | ---- | ---- | ---- | ----- | ---- | --- | |
| 12L15 | .15 | ---- | 1.15 | ----- | ----- | ---- | ---- | ---- | ----- | ---- | .35 | |
| Maxel 3-1/2 | .55 | .30 | 1.35 | ----- | .75 | ---- | .25 | ---- | ----- | ---- | --- | |
| Chrome Moly #2 | 1.35 | .35 | .95 | ----- | .90 | ---- | .55 | ---- | ----- | ---- | --- | |
| .50% Cr.C. | 1.20 | .35 | .35 | ----- | .55 | ---- | ---- | ---- | ----- | ---- | --- | |
| 1.00% Cr.C. | 1.20 | .35 | .35 | ----- | 1.25 | ---- | ---- | ---- | ----- | ---- | --- | |
| 2330 | .33 | .35 | .80 | ----- | ----- | ---- | ---- | ---- | 3.75 | ---- | --- | |
| 4130 | .34 | .30 | .60 | ----- | 1.15 | ---- | .25 | ---- | ----- | ---- | --- | |
| 4140 | .44 | .30 | 1.00 | ----- | 1.15 | ---- | .25 | ---- | ----- | ---- | --- | |
| 4150 | .54 | .30 | 1.10 | ----- | 1.20 | ---- | .25 | ---- | ----- | ---- | --- | |
| 4320 | .22 | .30 | .65 | ----- | .60 | ---- | .30 | ---- | 2.00 | ---- | --- | |
| 8620 | .23 | .30 | .90 | ----- | .60 | ---- | .25 | ---- | .70 | ---- | --- | |
| 8660 | .64 | .30 | 1.00 | ----- | .60 | ---- | .25 | ---- | .70 | ---- | --- | |
| 52100 | 1.10 | .30 | .45 | ----- | 1.60 | ---- | ---- | ---- | ----- | ---- | --- | |
| O-1 | .90 | ---- | 1.20 | .50 | .50 | .20 | ---- | ---- | ----- | ---- | --- | |
| 316 | .08 | 1.00 | 2.00 | ----- | 18.00 | ---- | 3.00 | ---- | 14.00 | ---- | --- | |
| 17-4PH | .07 | 1.00 | 1.00 | ----- | 17.50 | ---- | ---- | ---- | 5.00 | 5.00 | --- | .45 Nl+Tc |