I. PRODUCT IDENTIFICATION

MANUFACTURER'S NAME:	**OSG Tap & Die, Inc.**
ADDRESS:	676 E. Fullerton Avenue Glendale Heights, IL 60139
TELEPHONE:	(630) 790-1400
DATE PREPARED:	04/01/93
DATE UPDATED:	02/11/08
TRADE NAME (Label Identity):	**OSG Tap & Die, Inc.**
CHEMICAL NAME (Generic):	Ferrous or Nonferrous Alloys High Speed Steel, Tool & Die Steel Taps, Endmills, Dies Carbide Taps, Carbide Drills
COMMON NAME:	Carbide end-mills, Carbide Dies

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II. HAZARDOUS INGREDIENTS

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

MATERIAL OR COMPONENT	CAS No.	OSHA PEL(Mg/M^3)	ACGIH TLV(Mg/M^3)
Cobalt	7440-48-4	0.1	0.1
Chromium	7440-47-3	1.0	0.50
Iron	1309-37-1	10	5
Manganese	7439-96-5 (Dust) (Fune)	5 (Ceiling) -	5 (Ceiling) 1
Molybdenum	7439-98-7	15	10
Nickel	7440-02-0	1	1
Vanadium	1314-62-1 (Dust) (Fune)	0.5 (Ceiling) 0.1 (Ceiling)	0.05 0.05
Titanium	13463-67-7	15	5
Carbon	1333-86-4	3.5	3.5 (As Carbon Black)
Tungsten	7440-33-7	-	5
Silicon	7440-21-2	-	5.0

	(Dust)		
	7429-90 (Dust)	-	10
Aluminum	(Fune)	-	5

REFER TO GRADE CHART → **GRADE CHART**
PEL = Permissible Exposure Limits
TLV = Threshold Limit Values

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III. PHYSICAL DATA

BOILING POINT:	5,000°F (10,800°F - CARBIDE TOOLS)
MELTING POINT:	2,500°F (5,400°F - CARBIDE TOOLS)
SPECIFIC GRAVITY (H_2O=1):	Approx. 7.8 - 8.2 (60°F) (Approx. 12 - 15 - CARBIDE TOOLS)
VAPOR PRESSURE:	N/A
VAPOR DENSITY (H_2O=1):	N/A
SOLUBILITY IN H_2O:	Insoluble
% VOLATILE BY VOLUME:	N/A
EVAPORATION (BUTYL ACETATE=l)	N/A
APPEARANCE & ODOR:	Various Shapes, Solid, Odorless Metal

N/A = Not Available

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IV. FIRE & EXPLOSION DATA

FLASH POINT:	N/A
FIRE POINT:	N/A

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V. HEALTH HAZARD INFORMATION

We do not consider this product in the form that it is sold, to constitute a physical hazard or a health hazard. Subsequent operations such as brazing, 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 ROUTE OF ENTRY	EMERGENCY FIRST AID
Inhalation	Remove to fresh air; if condition continues, consult physician.
	Flush well with running water to remove particulate.
Eye Contact	Get medical attention.
Skin Contact	Brush off excess dust. Wash area well with soap and water.
Ingestion	Seek medical help if large quantities of material have been ingested.

EFFECT 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 2 (see SECTION II).
EXPOSURE LIMITS:
SECTION II lists specific ingredients and permissible exposure limits.
IMPORTANT:
Determine actual exposure by industrial hygiene monitoring.
POSSIBLE SIGNS & SYMPTOMS OF EXPOSURE TO DUST, WELDING FUMES, NAD 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, fumes, gases, etc. that occur by way of subsequent operations on the product. Some studies would associate on (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 PRE-EXISTING RESPIRATORY OR ALLERGIC CONDITION MAY OCCUR IN SOME WORKERS.

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VI. REACTIVITY DATA

STABILITY:	Chemically Stable
INCOMPATIBILITY:	Reacts with Strong Acids to generate Hydrogen Gas
HAZARDOUS DECOMPOSITION PRODUCTS:	Metallic Oxides

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VII. SPILL, LEAK OR DISPOSAL INFORMATION

STEPS TO BE TAKEN IN CASE OF RELEASE OR SPILL: N/A WASTE DISPOSAL METHOD:

SOLID:	Sell as scrap for reuse.
DUST, ETC.:	Follow Federal, State and Local regulations regarding disposal.

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VIII. SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS:
Use general or local exhaust ventilation to keep airborne concentrations of dusts and fumes below the TLV. Consult a professional hygienist.
PERSONAL PROTECTION EQUIPMENT:

- RESPIRATORY PROTECTION:
  If fumes, misting or dust condition occurs & TLV as indicated in SECTION II is exceeded, provide NIOSH approved respirators.
- EYE PROTECTION:
  Recommended approved safety glasses or goggles when working with dust material.
- GLOVES: As required.
- OTHER CLOTHING OR EQUIPMENT: As required.

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IX. SPECIAL PRECAUTIONS

Use good housekeeping practices to prevent accumulations of dusts and to keep airborne dust concentrations to a minimum.
This material is potentially contaminated with coating 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. OSG Tap & Die, Inc. 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.

Grade Chart

TOOL & DIE STEELS
HIGH SPEED STEELS
TUNGSTEN CARBIDE
CHEMICAL SYMBOL LIST

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TOOL & DIE STEELS

AISI	C	Si	MN	S	W	CU	CR	V	MO	P	NI
A-2	1.00	0.30	0.60	-	0.00	-	5.25	0.25	1.10	-	-
A-7	2.30	0.40	0.70	-	1.10	-	5.25	4.75	1.10	-	-
A-8	0.55	0.90	0.30	-	1.20	-	5.00	-	1.25	-	-
D-2	1.55	0.38	0.30	-	-	-	12.00	0.80	0.80	-	-
D-4	2.20	0.30	0.20	-	-	-	12.00	0.40	0.80	-	-
	1.20	0.30	0.25	-	1.60	-	0.70	0.20	0.25	-	-
		0.35	0.80								0.25
O-7	1.05	MAX	MAX	-	1.25	-	0.75	-	-	-	MAX
H-13	0.37	1.02	0.45	0.02	-	0.075	0.02	0.49	1.17	0.24	0.12

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HIGH SPEED STEELS

AISI	C	Si	MN	W	CR	V	MO	CO
M-1	0.83	0.25	0.25	1.60	3.80	1.15	8.70	-
M-2	0.85	0.30	0.25	6.20	4.20	1.85	4.90	-
M-3-1	1.02	0.30	0.25	6.25	4.00	2.50	6.25	-
M-3-2	1.20	0.30	0.25	6.25	4.00	3.10	6.25	-

		0.40	0.40					
	1.30	MAX	MAX	2.00	4.10	3.00	10.00	-
M-4	1.27	0.30	0.25	5.50	4.50	4.00	4.50	-
	1.00	0.25	0.25	1.75	3.75	2.05	8.75	-
		0.50	0.40					
	1.01	MAX	MAX	1.80	4.10	2.00	9.00	-
		0.40	0.40					
M-7	0.80	MAX	MAX	1.20	6.30	1.10	5.50	-
				0.75				
M-10	0.89	0.25	0.25	MAX	4.00	1.90	8.25	-
M-11	0.90	0.30	0.30	1.00	8.25	1.35	8.60	1.75
M-15	1.57	0.25	0.25	6.50	4.75	5.00	3.00	5.00
M-30	0.81	0.25	0.25	1.60	0.38	1.25	8.70	4.75
M-33	0.90	0.22	0.22	1.50	3.75	1.15	9.50	8.00
M-34	0.90	0.22	0.22	2.00	4.00	2.00	8.00	8.00
		0.40	0.40					
M-35	0.85	MAX	MAX	6.20	4.10	2.00	5.20	4.75
M-36	0.85	0.22	0.22	5.75	4.00	1.90	4.75	8.25
M-41	1.13	0.38	0.28	6.75	4.25	2.00	3.75	5.00
M-42	1.07	0.25	0.25	1.50	3.75	11.15	9.50	8.00
		1.00	1.00					
M-48	2.00	MAX	MAX	11.00	5.00	4.00	6.00	10.00
				0.50				
M-50	0.83	0.20	0.25	MAX	4.10	1.00	4.25	-
M-52	0.90	0.30	0.30	1.15	3.95	1.95	4.50	-
M-95	0.95	0.40	0.40	1.75	4.00	1.20	5.00	-
							1.00	
T-1	0.73	0.32	0.20	18.00	4.00	1.00	MAX	-
							0.50	
T-2	0.85	0.35	0.25	18.10	4.25	2.00	MAX	-
T-4	0.73	0.32	0.20	18.25	4.25	1.08	0.65	4.75
T-5	0.78	0.30	0.25	18.50	4.75	2.05	0.95	8.90
							0.65	
T-15	1.57	0.25	0.25	12.50	4.75	5.00	MAX	5.00

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TUNGSTEN CARBIDE

	WC	CO	TIC	TAC
10% CO WC	90	10	-	-
6% CO WC	94	6	-	-
13% CO WC	87	13	-	-
9% CO WC	71	9	8	12
21% CO WC	79	21	-	-

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CHEMICAL SYMBOL LIST

C	Carbon	s	Sulphur
CO	Cobalt	Si	Silicon
CR	Chromium	TA	Tantalum
			Tantalum
FE	Iron	TAC	Carbide
MO	Molybdendum	TX	Titanium
			Titanium
MN	Manganese	TIC	Carbon
NI	Nickel	V	Vanadian
P	Phosphous	W	Tungsten

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