MATERIAL SAFETY DATA SHEET

G. S Welding

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Vincent Metals
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SECTION I. MATERIAL IDENTIFICATION

Copper/Copper Alloys

See attached alloy composition sheets for alloy presence and percentages of alloying ingredients.

SECTION II. HAZARDOUS INGREDIENTS

Copper/Copper Alloys

	CAS Number		OSHA-PEL 8-hr TWA	ACGIH-TLV 8-HR TWA (1988-89)	ACGIH STEL (1988-89)
Aluminum #	(7429-90-5)	(Dust)	15 mg/m³	10 mg/m³	–
		(Fume)	5 mg/m³	5 mg/m³	–
Antimony #	(7440-36-0)		0.5 mg/m³	0.5 mg/m³	–
Arsenic #	(7440-38-2)		0.5 mg/m³	0.02 mg/m³	–
Beryllium #	(7440-41-7)		0.002 mg/m³	0.002 mg/m³	0.005*
Cadmium #	(7440-43-9)	(Dust)	0.2 mg/m³	0.05 mg/m³	–
		(Fume)	0.1 mg/m³	0.05 mg/m³*	–
Carbonblack	(1333-86-4)		3.5 mg/m³	–	–
Chromium #	(7440-47-3)		1 mg/m³	0.5 mg/m³	–
Cobalt #	(7440-48-4)		0.05 mg/m³	0.1 mg/m³	–
Copper #	(7440-50-8)	(Dust)	1 mg/m³	1 mg/m³	–
		(Fume)	0.1 mg/m³	0.2 mg/m³	–
Iron	(1309-37-1)		10 mg/m³	5 mg/m³ (As iron oxide fume)	–
Lead # ③	(7439-92-1)		0.05 mg/m³	0.15 mg/m³	–
Manganese #	(7439-96-5)	(Dust)	5 mg/m³	5 mg/m³	–
		(Fume)	–	1 mg/m³	3 mg/m³
Nickel #	(7440-02-0)		1 mg/m³	1 mg/m³	–
Phosphorus #	(7723-14-0)		0.1 mg/m³	0.1 mg/m³	–
Silicon	(7440-21-3)	(Dust)	10 mg/m³	10 mg/m³①	–
		(Fume)	5 mg/m³	–	–
Silver #	(7440-22-4)		0.01 mg/m³	0.1 mg/m³	–
Sulphur Dioxide #	(7446-09-5)		5 mg/m³	5 mg/m³	5/10 mg/m³
Tellurium #	(13494-80-9)		0.1 mg/m³	0.1 mg/m³	–
Tin ②	(7440-31-5)		2 mg/m³	2 mg/m³	0.2 mg/m³ (contemplated)
Zinc #	(1314-13-2)	(Dust) ①	10 mg/m³	10 mg/m³	–
		(Fume)	5 mg/m³	5 mg/m³	10 mg/m³
Zirconium	(7440-67-7)		5 mg/m³	5 mg/m³	10 mg/m³

* Ceiling Limit

Note: antimony trioxide, beryllium, cadmium, chromium, cobalt-chromium alloy, lead and nickel have been identified as potential human carcinogens. # denotes a toxic chemical or chemicals subject to reporting requirements of Section 313 of Title III of the S.A.R.A. of 1986 and CFR Part 372.

① Value is for total dust containing no asbestos and less than 1% free silicon.

② Contemplated change to 0.2 STEL and 0.1 TWA.

③ Under court remand.

SECTION III. PHYSICAL DATA

Physical Form:	Solid	Specific Gravity:	7.45 - 9.00
Boiling Point:	Not Applicable	Vapor Density	Not Applicable
Freeze-Melt Temperature:	Approximately 1290° - 2260° F	Solubility in H_2O:	Insoluble
Vapor Pressure:	Not Applicable	Color:	Silver or Yellow to Red
Evaporation Rate:	Not Applicable	Odor:	None

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point: (Method Used) Not Applicable
Extinguishing Media: See Below
Flammable Limits (LEL-UEL) Not Applicable
Auto Ignition Temp. - Not Applicable

Special Fire Fighting Procedures: Solid massive form is not combustible. Fire and explosion hazards are moderate when material is in the form of dust and exposed to heat, flames, chemical reaction, or in contact with powerful oxidizers. Use special mixtures of dry chemical or sand. Firefighters should wear self-contained breathing apparatus and protective clothing.

SECTION V. REACTIVITY DATA

Stability: Stable
Conditions to Avoid: Stable under normal conditions of transport and storage. Molten metal may react violently with water.
Incompatibility (Materials to Avoid): Acids, bases, and oxidizers.
Hazardous Decomposition or By-products: Metal fume.
Hazardous Polymerization: Will not occur.

SECTION VI. HEALTH HAZARD DATA

Permissible exposure limits and threshold limit values, See Section II.
Route(s) of Entry: Inhalation: Yes; Skin: Yes; Ingestion: Yes
Under normal handling conditions the solid alloy presents no significant health hazards. Processing of the alloy by dust or fume producing operation (grinding, buffing, heating, welding, etc.) may result in the potential for exposure to airborne metal particulates or fume. The exposure levels in Section II are relevant to fumes and dusts.
Effects of Overexposure:
Aluminum – Excessive exposure to aluminum fume and dust has been associated with lung disease, but this effect is probably due to simultaneous silica exposure.
Antimony – Antimony and its compounds are irritating to the skin and mucous membranes and are systemic poisons. Effects are reported to include metallic taste in the mouth, vomiting, colic, loss of appetite and weight, cardiac problems, and diarrhea. In addition, dermatitis may result which starts as an inflammation of the hair follicles and can progress through pus formation and sloughing to leave a contracted scar.
Beryllium – Inhalation of beryllium dust or fume may result in the production of an acute or chronic systemic disease depending upon the level of exposure and the beryllium compound involved. Granulomatous lesions of the skin, liver, kidneys, spleen, and lymph nodes have been reported.
Damage to the lungs may be in both the acute and chronic forms, both of which have similar signs and symptoms. These include a relatively non-productive cough, progressive difficulty in breathing, loss of appetite, and loss of weight. The major difference between the two is the suddenness of onset and the rate of progression. In the acute form, the symptoms appear in several hours to several weeks after exposure and there is usually rapid progression of signs including dyspnea, anorexia, and extreme weight loss. Complete recovery is possible and fatal cases usually result from acute heart disease. In chronic beryllium disease, the symptoms or signs are generally delayed in their onset and are persistent in nature. They may be triggered or aggravated by stresses such as pregnancy, respiratory infection, and thyrotoxicosis. In the progression of the disease, symptoms of heart disease may occur. Beryllium is also a suspected human carcinogen and has caused cancer in laboratory animals.
Cadmium – Inhalation of cadmium fumes may cause respiratory irritation with a sore, dry throat and a metallic taste followed by a cough, chest pain, and difficulty in breathing. Bronchitis, pneumonitis, and pulmonary edema have been reported as a result of the irritation of the fumes. Headaches, dizziness, loss of appetite, and weight loss have also been reported and the liver, kidneys and bone marrow may be injured by the presence of the metal.
Continued exposure to lower levels of cadmium has resulted in chronic poisoning characterized by irreversible lung damage and kidney damage. A single, high level exposure to cadmium can cause severe lung irritation which may be fatal. Cadmium is also a suspected human carcinogen.

MATERIAL SAFETY DATA

ALLOY % COMPOSITION - CARBON STEEL

Vincent Metals

ALLOY	ALUMINUM	ARSENIC	BERYLLIUM	CARBON	CHROMIUM	COBALT	COLUMBIUM	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MOLYBDENUM	NICKEL	NITROGEN	PHOSPHORUS	SILICON	SULPHUR	TANTALUM	TELLURIUM	TIN	TITANIUM	ZINC		
1008				.1					99.			.4													
1018				.17					99.			.7													
1020				.2					99.			.45													
1022				.2					98.			.85													
1026				.25					98.			.75													
1029				.28					98.			.75													
1030				.3					98.			.75													
1035				.35					98.			.75													
1040				.38					98.			.75													
1042				.44					98.			.75													
1045				.45					98.			.75													
1050				.5					98.			.75													
1060				.6					98.			.75													
1070				.7					98.			.75													
1117				.17					98.			1.15						.1							
1137				.35					98.			1.5						.1							
1141				.4					98.			1.5						.1							
1144				.44					97.			1.5						.28							
1213				.1					98.			.85				.1		.28							
1215				.08					98.			.9				.06		.3							
A106				.25					98.			.9					.2								
1541				.4					98.			1.5													
12L14				.12					98.	.25		1.				.06		.3							
4130				.3	.95				97.			.5	.2				.2								
4140				.4	.95				97.			.85	.2				.2								
4142				.42	.95				97.			.85	.2				.2								
4145				.45	.95				97.			.85	.2				.2								
4147				.47	.95				97.			.85	.2				.2								
4150				.5	.95				97.			.85	.2				.2								
4320				.2	.5				96.			.5	.25	1.8			.2								
4340				.4	.8				95.			.7	.25	1.8			.2								
4815				.15					95.			.5	.25	3.5			.2								
4817				.17					95.			.5	.25	3.5			.2								
4820				.2					95.			.6	.25	3.5			.2								
5150				.5	.8				97.			.8					.2								
5160				.6	.8				97.			.85					.2								
8620				.2	.5				97.			.8	.2	.5			.2								
C-75				.2	.95				97.			.5	.2				.2								
J-55				.38					98.			.75													
K-55				.38					98.			.75													
L-80				.4	.95				97.			.85	.2				.2								
N-80				.4	.95				97.			.85	.2				.2								
P-110				.4	.95				97.			.85	.2				.2								
9CH1M0				.13	9.				89.			.45	1.				.2								
718	.5			.03	19.	.25	5.		18.			.3	3.	52.			.3					1.			
400				.15				31.	2.			.6		65.											
K500	2.8			.2				28.	1.5			1.		65.			.35					.75			
514				.2	.5				98.			.8	.2				.25								
A588				.12				.6	97.			1.	.2	1.											
H-11				.4	5.				92.		.30		1.3				.9								
Stress Proof				.44					97.			1.5						.28							
4330				.33	.8				95.			.7	.25	1.8			.2								
52100				1.	1.45				97.			.3					.2								

MATERIAL SAFETY DATA

Vincent Metals

ALLOY % COMPOSITION – COPPER

ALLOY	ALUMINUM	ARSENIC	BERYLLIUM	CARBON	CHROMIUM	COBALT	COLUMBIUM	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MOLYBDENUM	NICKEL	NITROGEN	PHOSPHORUS	SILICON	SULPHUR	TANTALUM	TELLURIUM	TIN	TITANIUM	ZINC		
101								99.99								.0003				.001					
102								99.95																	
110								99.9								.012				.6					
145								99.9										.5							
147								99.9																	
172			1.9			.1		98.1						.1									20.		
240								80.	.05	.05													30.		
260								70.	.05	.07													9.1		
314								89.	.1	2.5													8.1		
316								89.	.1	1.9				1.		.1							36.2		
353								62.	.1	1.8													35.5		
360								61.5	.35	3.											.8		39.7		
464								60.	.1	.2											.7		37.5		
485								60.	.1	1.8											5.		.3		
510								94.8	.1	.05						.35					4.		4.		
544								88.	.1	4.						.5					.6				
623	10.							87.		3.		.5		1.			.25				.2				
624	11.							86.		3.		.3					.25				.2		.3		
630	10.							82.		3.		1.5		5.			.25				.2		.5		
642	7.6	.15						91.2	.3	.05		.1		.25			1.8						1.5		
651								98.5	.8	.05		.7					1.5						1.5		
655								97.	.8	.05		1.5		.6			3.				7.		3.		
660								83.		7.											.3				
673	.25							63.	.5	3.		3.5		.25			1.5						14.5		
694								81.5	.2	.3							4.						1.		
715								69.5	.5	.05		1.		30.											
954	10.5							85.5	3.5			.5		1.5											

ALLOY % COMPOSITION – ALUMINUM

1100	99.							.12				.05					.95						.01		
1145	99.45							.05			.05	.05					.55						.05		
2011	Rem							5.5	.7	.4							.4						.3		
2014	Rem							4.4			.5	.8					.8								
2017	Rem				.1			4.	.7		.6	.7					.5						.25		
2024	Rem				.1			4.4	.5		1.5	.6					.5					.15	.25		
2124	Rem				.1			4.4	.3		1.5	.6					.2					.15	.25		
3003	Rem							.12	.7			1.2					.6						.1		
3004	Rem							.25	.7		1.	1.2					.3						.25		
3005	Rem				.1			.3	.7		.4	1.2					.6					.1	.25		
3105	Rem				.2			.3	.7		.5	.6					.6					.1	.4		
5005	Rem				.1			.2	.7		.8	.2					.3						.25		
5052	Rem				.25			.1	.4		2.5	.1					.25						.1		
5086	Rem				.15			.1	.5		4.	.45					.4					.15	.25		
6061	Rem				.2			.28	.7		1.	.15					.6					.15	.25		
6063	Rem				.1			.1	.35		.7	.1					.4					.1	.1		
6101	Rem				.03			.1	.5		.6	.03					.5						.1		
6463	Rem							.2	.15		.7	.05					.4						.05		
7050	Rem				.04			2.3	.15		2.2	.1					.12					.06	6.2		
7075	Rem				.23			1.6	.5		2.5	.3					.4					.2	5.6		

MATERIAL SAFETY DATA — ALLOY % COMPOSITION — STAINLESS STEEL

Vincent Metals

ALLOY	ALUMINUM	ARSENIC	BERYLLIUM	CARBON	CHROMIUM	COBALT	COLUMBIUM	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MOLYBDENUM	NICKEL	NITROGEN	PHOSPHORUS	SILICON	SULPHUR	TANTALUM	TELLURIUM	TIN	TITANIUM	ZINC		
15-5PH				.07	15.5			4.5				1.		5.5		.04	1.	.03	.45						
17-4PH				.07	17.5			5.00				1.		5.		.04	1.	.03	.45						
201				.15	18.							6.		5.5	.25	.06	1.	.03							
301				.15	18.							2.		8.		.045	1.	.03							
302				.15	19.							2.		10.		.045	1.	.03							
303				.15	19.							2.	.6	10.		.2	1.	.15							
304				.08	20.							2.		10.5		.045	1.	.03							
305				.12	19.							2.		13.		.045	1.	.03							
308				.08	21.							2.		12.		.045	1.	.03							
309				.2	24.							2.		15.		.045	1.	.03							
310				.25	26.							2.		22.		.045	1.5	.03							
316				.08	18.							2.	3.	14.		.045	1.	.03							
321				.08	19.							2.		12.		.045	1.	.03				.4			
347				.08	19.							2.		13.		.045	1.	.03	.8						
405	.3			.08	14.5							1.				.04	1.	.03							
409				.08	11.75							1.				.045	1.	.045				.75			
410				.15	13.5							1.				.04	1.	.03							
414				.15	13.5							1.		2.5		.04	1.	.03							
416				.15	14.							1.25	.6			.06	1.	.15							
420				.15	14.							1.				.04	1.	.03							
430				.12	18.							1.				.04	1.	.03							
431				.2	17.							1.		2.5		.04	1.	.03							
440C				1.2	18.							1.	.75			.04	1.	.03							
446				.2	27.							1.5			.25	.04	1.	.03							

IMPORTANT

LIABILITY DISCLAIMER

The Information contained in this Material Safety Data Sheet (MSDS) is believed to be correct as it was obtained from sources we believe are reliable, including: "Threshold Limit Values & Biological Exposure Indices for 1988-89" (American Conference of Government & Industrial Hygienists), Air Contaminants–Permissible Exposure Limits (Title 29, Code of Federal Regulations, part 1910.1000–OSHA), and OSHA (Cleveland Area Office) letter of 6/15/89. However, no representations, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications, hazards connected with the use of the material, or the results to be obtained from the use thereof. User assumes all risks and liability of any use, processing or handling of any material, variations in methods, conditions and equipment used to store, handle or process the material and hazards connected with the use of the material are solely the responsibility of the user and remain at his sole discretion.

Compliance with all applicable federal, state, and local laws and regulations remains the responsibility of the user, and the user has the responsibility to provide a safe work place, to examine all aspects of its operation and to determine if or where precautions, in addition to those described herein, are required.

Note: Chemical analysis has not been performed by Vincent Metals. Data supplied is furnished by various suppliers.

For actual compositions, please refer to "Certified Material Test Report" or specific grade specification sheets.

The information contained in these alloy composition sheets should not be used for ordering or specification purposes. It is only intended to give general information for Material Data Sheets purposes.

Chromium – In some workers, chromium compounds act as allergens and may cause dermatitis and may also produce pulmonary sensitization. Chromic acid and chromates have a direct corrosive effect on the skin and the mucous membranes of the upper respiratory tract. Although rare, there may be the possibility of skin and pulmonary sensitization. IARC has determined that there is sufficient evidence of increased lung cancer among workers in the chromate-producing industry and possible chromium alloy workers. This determination is supported by sufficient evidence for carcinogenicity to animals and possible mutagenicity testing of Cr VI compounds.

Cobalt – Cobalt has been reported as causing hypersensitization type dermatitis in individuals who are susceptible. Animal studies have shown that particulate cobalt is an acutely irritating substance and industrial exposures, possibly combined with small amounts of silica, are reported capable of producing serious pneumoconiosis which is initially of an insidious nature.

Copper – Melting, grinding, cutting of copper may produce fumes or dust exposure and breathing these fumes or dust may present potentially significant health hazards. Fumes of copper may cause metal fume fever with flu-like symptoms and skin and hair discoloration. While industrial dermatitis has not been reported, keratinization of the hands and the soles of the feet has been reported. Systemically as well, copper dust and fume cause irritation of the upper respiratory tract, metallic taste in the mouth, and nausea.

Iron – The inhalation of iron oxide fumes or dust may cause an apparent benign pneumoconiosis which is called siderosis. This disease is reported to be disabling, but makes x-ray diagnosis of other lung conditions difficult or impossible.

Lead – Short term exposure: Lead is an accumulative poison. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include decreased physical fitness, fatigue, sleep disturbance, headache, aching bones and muscles, constipation, abdominal pains, and decreasing appetite. The effects are reversible and complete recovery is possible. Inhalation of large amounts of lead may lead to seizures, coma, and death.

Lead – Long term exposure: Long term exposure can result in a buildup of lead in the body and more severe symptoms. These include anemia, pale skin, a blue line at the gum margin, decreased handgrip strength, abdominal pain, severe constipation, nausea, vomiting, and paralysis of the wrist joint. Prolonged exposure may also result in kidney damage. If the nervous system is affected, usually due to very high exposures, the resulting effects include severe headache, convulsions, coma, delirium, and death. Alcohol ingestion and physical exertion may bring on symptoms. Continued exposure can result in decreased fertility and/or increased chances of miscarriage or birth defects.

Manganese – Chronic manganese poisoning may result from inhalation of dust or fume. The central nervous system is the chief site of the injury, and there also may be adverse blood and kidney effects. Chronic manganese poisoning is not a fatal disease although it is extremely disabling. Some individuals may be hypersusceptible to manganese. Freshly formed manganese fume has caused fever and chills similar to metal fume fever.

Nickel – The most common ailment arising from contact with nickel or its compounds is an allergic dermatitis known as "nickel itch" which usually occurs when the skin is moist. Generally nickel and most salts of nickel do not cause systemic poisoning, but nickel has been identified as a suspected carcinogen. There can also be adverse effects to the lungs and nasal cavities.

Silicon – Accumulation in lungs may be responsible for benign pneumoconiosis, but is not considered to be responsible for pulmonary functional impairment or respiratory symptoms.

Tin – The inhalation of inorganic tin fumes or dust may cause an apparent benign pneumoconiosis called stannosis which is reported not to be disabling.

Zinc (as Oxide) – Zinc is very low in toxicity, but inhalation of fumes may cause "metal fume fever." Onset of symptoms may be delayed 4-12 hours and include irritation of the nose, mouth and throat, cough, stomach pain, headache, nausea, vomiting, metallic taste, chills, fever, pains in the muscles and joints, thirst, bronchitis or pneumonia and a bluish tint to the skin. These symptoms go away in 24-48 hours and leave no effect.

Note: Antimony trioxide, beryllium, cadmium, chromium, cobalt-chromium alloy, lead and nickel have been identified as potential human carcinogens.

Emergency First Aid Procedures:

Eye Contact Flush well with running water to remove particulate. Get medical Attention.

Skin Contact Vacuum of excess dust. Wash well with soap and water.

Inhalation Remove to fresh air. Get medical attention.

Ingestion Seek medical attention if large quantities of materials have been ingested.

SECTION VII. PRECAUTIONS FOR SAFE HANDLING OR USE

Steps to be Taken in Case Material is Released or Spilled: No special precautions are necessary for spills of bulk material. If large quantities of dust are spilled, remove by vacuuming or wet sweeping to prevent heavy concentration of airborne dust. If liquids (acids or bases) containing solubilized metal are spilled evacuate unprotected personnel from area. Absorb liquid by means of vermiculite, dry sand or similar material. Follow federal, state, and local regulations concerning the disposal of waste.

Waste Disposal Method: Dispose of in accordance with federal, state, and local regulations. Cleanup personnel should wear respirators and protective clothing. Ventilate area of release.

Precautions to be Taken in Handling and Storing: Store material away from incompatible materials and keep dust from sources of ignition.

Other Precautions: See all other sections of this MSDS.

SECTION VIII. CONTROL MEASURES

Respiratory Protection: If exposure above the PEL or TLV, NIOSH approved respirator for fume or dust, dependent upon the source of airborne contaminant.
Ventilation: Required if dust or fume created in handling or working on this material.
Local Exhaust: Required if dust or fume created in handling or working on this material.
Mechanical (general): As above to reduce airborne dust or fume levels.
Protective Gloves: Required for melt, grind, cut or weld operations. Select glove approved for the specific operation.
Eye Protection: Required for melt, grind, cut, or weld operations. Minimum requirement of safety glasses with slide shields for these operations. Melting and welding may require special eye protection including face shields and specially tinted glass. Grinding operations may also require face shields.
Other Protective Clothing or Equipment: As required for the work done on or with the metal.
Work/Hygiene Practices: As required for the work done with lead bearing materials. Meet requirements of the OSHA lead standard where necessary. Always evaluate the jobs done on this product in accordance with OSHA or relevant state, federal, or local standards.

Note: Chemical analysis has not been performed by Vincent Metals. Data supplied is furnished by various suppliers.

For actual compositions, please refer to "Certified Material Test Report" or specific grade specification sheets.

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