



*A Milacron Company*

Dear Customer:

Enclosed is the **REVISED** Material Safety Data Sheet for our product:

**D-M-E #6 STEEL**

The products we distribute are not normally hazardous in their natural state. However, steel does contain elements deemed by OSHA to be hazardous when released by manufacturing, such as brazing, burning, grinding, sawing or welding, etc. Failure to control dust and fumes can result in chronic health problems.

We believe the information, supplied by the Manufacturer, on the enclosed MSDS to be accurate; however, D-M-E makes no warranty with respect to the accuracy of the information or the suitability of the recommendations, and assumes no liability for the information so presented.

Should you require additional information, please call or write the Manufacturer listed on the MSDS.

Sincerely yours,

D-M-E Company  
Director of Operations  
Ken Jasina

Revised: May 2005

# MATERIAL SAFETY DATA SHEET

MATERIAL IDENTIFICATION AND USE			SUPPLIER: SAMUEL, SON & CO. LTD.
MATERIAL NAME: STAINLESS/SPECIALTY STEEL		ADDRESS: 2360 Dixie Road	Mississauga, Ontario
SYNONYMS: Includes all sheet products, plate, strip, bar, slab, ingot and tubular products			L4Y 1Z7
WHMIS CLASS: D2A, D2B		PHONE: (905) 279-5460	
MATERIAL USE: MANUFACTURE OF ARTICLES		TOLL FREE: 1-800-26SAMUEL	
		FAX: (905) 279-9658	

## HAZARDOUS INGREDIENTS (ALL VALUES ARE MAXIMUM AND EXPRESSED AS WEIGHT PERCENT)

Component	CAS Number	TLV ACGIH (mg/m <sup>3</sup> )	LD 50/LC 50	Electric Alloy Steels	Tool Steels	300, 400 Series Stainless Steels
IRON	7438-89-5	5 (fume)	Not Available	95	90	80
CHROMIUM	7440-47-3	.5	Not Available	5	25	30
NICKEL	7440-02-0	1	> 9 gm/kg (oral-rat)	5	5	35
MOLYBDENUM	7439-98-07	10	Not Available	2	5	6
VANADIUM	1314-62-1	.05	Not Available	2	5	—
COBALT	7440-48-4	.75	Not Available	.75	8	1
MANGANESE	7439-96-5	1 (fume)	9 gm/kg (oral-rat)	—	—	2.5
ALUMINUM	7429-90-5	10	Not Available	1.5	—	—
SILICON	7440-21-3	10	Not Available	2	2,5	—
COPPER	7440-50-8	.2 (fume)	Not Available	—	—	5

\* As required by WHMIS Ingredient Disclosure List. For exact composition refer to analysis or specifications

### NON-METALLIC COATINGS

- Dry-Lube - Mixture of Borate and Carbonate Soap Lubricants for metal forming.
- Pre-Lube - Petroleum Based Oil Coating used for metal forming.
- Lube Oil - Lubricating Protective Petroleum Based Oil.
- Slushing Oil - Mineral Oil Based Protective Coating containing small quantities of Anti-Oxidants.
- Vanishing Oil - Solvent applied Petroleum Oil Protective Coating leaving a wax-like protective coating.

NOTE: Individual coating components are present at values below the reporting requirements of the WHMIS Ingredient Disclosure List.

### PHYSICAL DATA

Physical State: Solid	Odour: na	Evaporation Rate: na	Boiling Point: na
Vapour Pressure: na	Vapour Density: na	Freezing Point: 1530 C	Density: 7.86
Coefficient Water/Oil Distribution: na	pH: na		Odour Threshold: na
Appearance: Silver Grey Metallic (Steel)			Solubility in Water: na

### FIRE AND EXPLOSION HAZARDS - NOT APPLICABLE

### REACTIVITY DATA

Chemical Stability: YES	Incompatibility to other substances: YES
Conditions of Reactivity:	Contact with Mineral Acids will release Hydrogen Gas.
Hazardous Decomposition Products:	na

PAGE 1: LEGEND: na: NOT APPLICABLE, U: UNKNOWN

The information contained herein is based on data considered accurate, however, no warranty is expressed or implied regarding the accuracy of these data or the results obtained from the use thereof.

# MATERIAL NAME: STAINLESS/SPECIALTY STEEL

## PREVENTIVE MEASURES

**Personal Protective Equipment:** Dependent upon process being performed on material. Each operation must be addressed for suitable equipment.

<b>Gloves (Specify):</b>	Leather-Faced	<b>Eye (Specify):</b>	na
<b>Clothing (Specify):</b>	na	<b>Footwear (Specify):</b>	na
<b>Respiratory (Specify):</b>	na	<b>Other (Specify):</b>	na Approved Fume Filter Respirator, Gloves & Eyewear required during welding.

**Engineering Controls (eg. ventilation, enclosures, specify):** General or Local Exhaust Ventilation during welding.

**Leak and Spill Procedures:** na

**Water Disposal:** na

**Storage Requirements:** na

**Special Shipping Information:** na

## TOXICOLOGICAL PROPERTIES OF MATERIAL

**Route of Entry:** Prolonged skin contact with coated steel may cause skin irritation in sensitive individuals. Inhalation of metal particulate or elemental oxide fumes generated during welding, burning, grinding or machining may pose acute or chronic health effects.

**Effects of Acute Exposure to Material:** Inhalation of overexposure to Manganese, Copper or Zinc (coated products) may cause metal fume fever characterized by fever and chills (ie. Flu-like symptoms) appears 4-6 hours after exposure with no long-term effects.

**Effect of Chronic Exposure to Material:** Prolonged Inhalation overexposure to metal fume from product may cause the following effects: benign pneumoconiosis (siderosis) with few or no symptoms (Iron Oxide); certain Nickel and Chromium Compounds have been listed with IARC as nasal and lung carcinogens. Cobalt Dust may result in an asthma-like condition. (Cough/Shortness of Breath).

<b>Irritancy of Material:</b>	na	<b>Sensitization to Material:</b>	na	<b>Mutagenicity of Material:</b>	na
<b>Reproductive Effects:</b>	na	<b>Teratogenicity of Material:</b>	na	<b>Synergistic Materials:</b>	na

**Carcinogenicity of Material:** IARC lists certain Hexavalent Chromium Compounds under Its Group 1 Category - "Confirmed Human Carcinogen".  
IARC lists Nickel and certain Nickel Compounds under Its Group 2A Category - "Suspected Human Carcinogen".

**NOTE:** Prolonged skin contact may cause reddening and drying of skin or dermatitis in sensitive individuals from Nickel, Chromium and Cobalt content in steel.

## FIRST AID MEASURES

**Skin:** Maintain good personal hygiene. Wash with soap and water. Seek medical attention if necessary.

**Inhalation:** Remove to fresh air. Seek medical attention if necessary.

## PREPARATION DATE OF MATERIAL SAFETY DATA SHEET

**Prepared By:** Samuel, Son & Co. Limited      **Preparation Date:** March, 1998

**NOTE:** Contact supplier for additional product information.

The information contained herein is based on data considered accurate, however, no warranty is expressed or implied regarding the accuracy of these data or the results obtained from the use thereof.

# MATERIAL SAFETY DATA SHEET

## SECTION 1 PRODUCT IDENTIFICATION & USE

ALUMINUM ALLOYS (SERIES: 1000, 2000, 3000, 5000, 6000, & 7000)

SYNONYMS: SHEET, PLATE & ETC.  
WHMIS CLASS: D2A, D2B  
MATERIAL USE: MANUFACTURE OF ARTICLES

SUPPLIER: SAMUEL, SON & CO. LTD.  
2360 Dixie Road  
Mississauga, Ontario  
N3C 4B1

PHONE: (905) 279-5460

## SECTION 2 HAZARDOUS INGREDIENTS

Material or Component	CAS Number	% Weight	EXPOSURE LIMITS	
			OSHA PEL (mg/m <sup>3</sup> )	ACGIH TLV (mg/m <sup>3</sup> )
Base Metal				
Aluminum (Al)	7429-90-5	90-99.7	Not Established	10.0 Metal Dust & Oxide 5.0 Welded Fume
Alloying Elements				
Chromium (Cr)	7440-47-3	<0.01-0.4	1.0 Chrome Metal*	0.5 Chrome Metal
Copper (Cu)	7440-50-8	<0.05-6.0	0.1 Fume, 1.0 Dust	0.2 Fume, 1.0 Dust
Iron (Fe)	1309-37-1	<0.35-1.0	10 Oxide Fume	5 Oxide Fume
Magnesium (Mg)	1309-48-4	<0.03-4.9	15 Oxide Fume	10 Oxide Fume
Manganese (Mn)	7439-96-5	<0.02-1.5	5c Dust, 5c Fume	5c Dust, 1 Fume
Silicon (Si)	7440-21-3	<0.25-1.2	Not Established	10 Total Dust
Titanium (Ti)	7440-32-6	<0.02-0.2	15 Ti Dioxide	10 Ti Dioxide
Zinc (Zn)	1314-13-2	<0.05-8.1	5 Oxide Fume	10 Dust, 5 Fume
Bismuth (Bi)	7440-69-9	<0.40-0.7	Not Established	Not Established
Boron (B)	7440-42-8	0.06 max	15 Oxide Fume	10 Oxide Fume
Lead (Pb)	7439-92-1	<0.40-0.7	0.05 Dust & Fume	0.15 Dust & Fume
Vanadium (V)	7440-82-2	0.05 max	0.05c Dust, 0.1c Fume	0.05 Dust & 0.05 Fume

Note: Aluminum alloys will be comprised of various combinations of the elements shown above. In addition, other alloying elements may be present in minute quantities. No permissible exposure limits (PEL) or threshold limit values (TLV) exist for aluminum alloys. Values shown are applicable to component elements.

## SECTION 3 PHYSICAL DATA

Physical State: Solid	Odour & Appearance: Silver Gray - Odorless			Odour Threshold (PPM)
Vapour Pressure (mmHg)	Vapour Density Air	Evaporation R	Boiling Point	N/A
N/A	N/A	N/A	N/A	Freezing Point (C)
pH N/A	Specific Gravity: H <sub>2</sub> O=1 (Approx. 2.5 - 2.9)	Coeff. Water/Oil Dist		N/A
		N/A		

## SECTION 4 FIRE & EXPLOSION DATA

Flammability: "NO"	Means of Extinction: Dry Powder or Sand	*NOTE: Do not use Water or Halogen on Molten Aluminum
Flash Point (C): N/A	Upper Flammable Limit % by Vol: N/A	Lower Flammable Limit % by Vol: N/A
Autoignition Temp (°C): N/A	Hazardous Combustion Products: Aluminum Dust or Fines combined with Air will form Explosive Mixture.	
Explosion Data (Sensitivity to Impact): NO	(Sensitivity to Static Discharge): N/A	

## SECTION 5 REACTIVITY DATA

Chemical Stability: YES	Incompatibility with Other Substances: YES (Strong Acids)
Reactivity & under what conditions:	Sodium Hydroxide & Halogen Acids In contact with Alumin may generate explosive Hydrogen Mixtures.
Hazardous Decomposition Products:	Extreme Heat may produce Toxic or Irritating airborne particulate, including Metal and Metallic Oxide Fumes.

# MATERIAL NAME: STEEL

## PHYSICAL DATA

Physical State: Solid  
Vapour Pressure: na  
Coefficient Water/Oil Distribution: na  
Appearance: Silver Grey Metallic (Steel)

Odour: na  
Vapour Density: na  
pH: na  
Solubility in Water: na

Evaporation Rate: na  
Freezing Point: 1530 C  
Odour Threshold: na

Boiling Point: na  
Density: 7.86

## PREVENTIVE MEASURES

Personal Protective Equipment: Dependent upon process being performed on material. Each operation must be addressed for suitable equipment.

Gloves (Specify): Leather-Faced  
Clothing (Specify): na  
Respiratory (Specify): na

Eye (Specify): na  
Footwear (Specify): na  
Other (Specify): Fume Filter Respirator, Gloves & Eyewear required during welding.

Engineering Controls (eg. ventilation, enclosures, specify): General or Local Exhaust Ventilation during welding.

Leak and Spill Procedures: na

Water Disposal: na

Storage Requirements: Keep stored material dry to prevent corrosion.

Special Shipping Information: na

## TOXICOLOGICAL PROPERTIES OF MATERIAL

Route of Entry: Prolonged skin contact with coated steel may cause skin irritation in sensitive individuals. Inhalation of metal particulate or elemental oxide fumes generated during welding, burning, grinding or machining may pose acute or chronic health effects.

Effects of Acute Exposure to Material: Inhalation of overexposure to Manganese, Copper or Zinc (coated products) may cause metal fume fever characterized by fever and chills (ie. Flu-like symptoms) appears 4-6 hours after exposure with no long-term effects.

Effect of Chronic Exposure to Material: Chronic inhalation of overexposure to metal fume (Iron Oxide fume) may cause a benign pneumoconiosis (siderosis) with few or no symptoms. Chronic inhalation of Lead fumes may cause Lead poisoning which can affect the digestive system, nervous system, muscle and joints.

Imitancy of Material: na  
Sensitization to Material: na  
Mutagenicity of Material: na

Reproductive Effects: na  
Teratogenicity of Material: na  
Synergistic Materials: na

Carcinogenicity of Material: IARC lists certain Hexavalent Chromium Compounds under its Group 1 Category. "Confirmed Human Carcinogen".  
IARC lists Nickel and certain Nickel Compounds under its Group 2A Category. "Suspected Human Carcinogen".

NOTE: Iron containing welding fume has an exposure limit of  $5\text{mg}/\text{m}^3$  (ACGIH-TLV's 1988-89).  
Welding fume may also contain contaminants from Fluxes or Welding Consumables.

## FIRST AID MEASURES

Skin: Maintain good personal hygiene. Wash with soap and water. Seek medical attention if necessary.

Eye: For irritation from any coating material, flush eyes while holding eyelids open. Seek medical attention if necessary.

Inhalation: Remove to fresh air. Seek medical attention if necessary.

## PREPARATION DATE OF MATERIAL SAFETY DATA SHEET

Prepared By: Samuel, Son & Co. Limited  
Preparation Date: March, 1998

NOTE: Contact supplier for additional product information

PAGE 1: LEGEND: na NOT APPLICABLE, U: UNKNOWN

# MATERIAL SAFETY DATA SHEET

MATERIAL IDENTIFICATION AND USE			SUPPLIER: SAMUEL, SON & CO. LTD.
MATERIAL NAME: STEEL		ADDRESS: 2360 Dixie Road Mississauga, Ontario L4Y 1Z7	
SYNONYMS:	Includes all sheet products, plate, strip, bar, slab, ingot, structural shapes and tubular products.	PHONE: (905) 279-5460	
WHMIS CLASS: D2A, D2B		TOLL FREE: 1-800-26SAMUEL	
MATERIAL USE: MANUFACTURE OF ARTICLES		FAX: (905) 279-9658	

## HAZARDOUS INGREDIENTS BASE METAL (ALL VALUES ARE EXPRESSED AS WEIGHT PERCENT)

Component	CAS Number	TLV ACGIH (mg/m <sup>3</sup> )	LD 50	Carbon & H.S.L.A. Steels	Electrical Steels	Leaded & Low Alloy Steels	Flats & Tie Plates	Tubular Product
IRON	7438-89-8	5 (FUME)	U	91-99	91-99	92-96	94-96	94-96
MANGANESE	7439-96-5	1 (FUME)	9gm/kg oral-rat	< 2.0	< 2.0	< 2.2	< 1.1	< 1.7
CHROMIUM	7440-47-3	0.5	U	< 1.0	< 0.1	< 1.7	< 1.6	< 0.7
NICKEL	7440-02-0	1	> 9gm/kg oral rat	< 1.0	< 0.1	< 2.1	< 0.15	< 0.5
COPPER	7440-50-8	1	U	< 1.0	---	---	< 0.1	< 0.5
PHOSPHOROUS	7732-14-0	0.1	U	< 1.25	---	---	---	< 0.1
MOLYBDENUM	7439-9807	10	U	---	---	---	< 0.12	< 1.0
LEAD	7439-92-1	0.15	U	---	---	< 0.35	---	---

\* As required by WHMIS Ingredient Disclosure List. For exact composition refer to analysis or specifications

### METALLIC AND NON-METALLIC COATINGS

- |  |   |
|--|---|
| <p><b>Galvanize Galvanneal</b></p> <ul style="list-style-type: none"> <li>- Hot dipped Zinc (CAS 7440-66-6) Coating. Coating Weights range from 16 to 500 g/m<sup>2</sup> per side, may be chemically passivated with a Chromium Compound which leaves a residual Chromium level of 11 to 40 mg/m<sup>2</sup> per side. Petroleum based rust preventive oils are applied to oiled product. Typical oil coating weights range from 1.1 to 5.4 g/m<sup>2</sup> per side.</li> </ul> <p><b>Galvalume</b></p> <ul style="list-style-type: none"> <li>- Hot dipped Zinc (CAS 7440-66-6) 43% and Aluminum (CAS 7429-90-5) 55% coating. Coating weights range from 50 to 150 g/m<sup>2</sup> per side. May also be passivated or oiled similar to Galvanize Material.</li> </ul> <p><b>Tin Plate</b></p> <ul style="list-style-type: none"> <li>- Electroplated with Tin (CAS 7440-31-5) coating. Coating weights range from 0.8 to 15 g/m<sup>2</sup> per side. Treated with Chromium passivation solution which leaves a Chromium residue of .05 to 7.5 mg/m<sup>2</sup> per side. May be coated with an edible oil to prevent scratching. Oil coating typically 0.1 micro inches thick.</li> </ul> <p><b>Chromium</b></p> <ul style="list-style-type: none"> <li>- Electroplated with Chromium (CAS 7440-47-3) coating. Coating weights range from 0.1 to 0.17 g/m<sup>2</sup> per side. May be coated with edible oil similar to tin plate.</li> </ul> <p><b>C<sub>2</sub> Coating Electrical</b></p> <ul style="list-style-type: none"> <li>- Glass film composed of Magnesium Ortho-Silicate formed during high temperature anneal.</li> </ul> <p><b>C<sub>0</sub> Coating Electrical</b></p> <ul style="list-style-type: none"> <li>- Oil modified Polyester Resin Varnish Film.</li> </ul> <p><b>C<sub>3</sub>M Coating Electrical</b></p> <ul style="list-style-type: none"> <li>- An Inorganic Iron - Silicate Complex that is heat and oil resistant with good insulating properties.</li> </ul> | <p><b>Dry-Lube</b></p> <ul style="list-style-type: none"> <li>- Mixture of Borate and Carbonate Soap Lubricants for metal forming.</li> </ul> <p><b>Pre-Lube</b></p> <ul style="list-style-type: none"> <li>- Petroleum based oil coating used for metal forming.</li> </ul> <p><b>Lube Oil</b></p> <ul style="list-style-type: none"> <li>- Lubricating Protective Petroleum Based Oil</li> </ul> <p><b>Shushing Oil</b></p> <ul style="list-style-type: none"> <li>- Mineral Oil Based Protective Coating containing small quantities of Anti-Oxidants.</li> </ul> <p><b>Vanishing Oil</b></p> <ul style="list-style-type: none"> <li>- Solvent applied Petroleum Oil Protective Coating leaving a Wax-like Protective Coating.</li> </ul> <p><b>Precoated</b></p> <ul style="list-style-type: none"> <li>- Cured paint/resin film applied to Sheet Steel Galvanized or Galvalume Coated Steel Sheet.</li> </ul> <p><b>Zincrometal</b></p> <ul style="list-style-type: none"> <li>- Protective Coating of Zinc Rich Paint over a Chromate Based Primer Compound. Coating is applied to one side of strip. Typical coating weights range from 0.215 to 0.325 g/m<sup>2</sup>.</li> </ul> |
|--|---|

**NOTE: Individual Coating Components are present at values below the reporting requirements of the WHMIS Ingredient Disclosure List**

### FIRE AND EXPLOSION HAZARDS - NOT APPLICABLE

#### REACTIVITY DATA

Chemical Stability: YES	Incompatibility to other substances: YES
Conditions of Reactivity:	Contact with Mineral Acids will release Hydrogen Gas.
Hazardous Decomposition Products:	na

PAGE 1: LEGEND: na: NOT APPLICABLE, U: UNKNOWN

The information contained herein is based on data considered accurate, however, no warranty is expressed or implied regarding the accuracy of these data or the results obtained from the use thereof.

# ALUMINUM ALLOYS (SERIES: 1000, 2000, 3000, 5000, 6000 & 7000)

## SECTION 6 TOXICOLOGICAL PROPERTIES OF MATERIAL

**Route of Entry:** Prolonged skin contact with coated steel may cause skin irritation in sensitive individuals. Inhalation of metal particulate or elemental oxide fumes generated during welding, burning, grinding or machining may pose acute or chronic health effects.

**Effects:** **Effects of Acute Exposure to Material:**  
Inhalation overexposure to Manganese, Copper or Zinc may cause metal fume fever characterized by fever & chills. i.e. Flu-like symptoms appears 4 - 6 hours after exposure with no long-term effects.

**Effects:** **Effects of Chronic Exposure to Material:**  
Prolonged Inhalation overexposure to metal fumes from product may cause the following effects:  
Benign Pneumoconiosis (Siderosis).  
Certain Nickel and Chromium Compound have been listed with IARC as nasal & lung carcinogens.  
Cobalt Dust may result in an Asthma-like condition. (Cough, Shortness of Breath).  
Chronic Inhalation of Lead Fumes may cause Lead Poisoning which can affect the digestive system, nervous system, muscles and joints.

Irritancy of Material: N/A

Sensitization to Material: N/A

Reproductive Effects: N/A

Teratogenicity of Material: N/A

Mutagenicity of Material: N/A

Synergistic Materials: N/A

Carcinogenicity of Material:

IARC lists certain Hexavalent Chromium Compounds under its Group 1 Category - "Confirmed Human Carcinogen".

IARC lists Nickel and certain Nickel Compounds under its Group 2A Category - "Suspected Human Carcinogen".

## SECTION 7 PREVENTIVE MEASURES

**Personal Protective Equipment:** Gloves (Leather faced gloves)  
Respirator (NIOSH Approved) when Grinding, Cutting or Welding  
Eye: Use approved eyewear when Grinding or Welding  
Footwear: N/A Clothing: N/A Other: N/A

**Engineering Controls:** N/A Leaks & Spill Procedure: N/A Waste Disposal: N/A

**Handling Procedures & Equipment:** N/A Storage Requirements: N/A

**Special Shipping Information:** N/A

## SECTION 8 FIRST-AID MEASURES

**Specific Measures:** Skin - Maintain good personal hygiene and wash with soap & water.  
Inhalation - Remove to fresh air, Seek medical attention if necessary.  
Eye - Flush with large amounts of running water. Seek medical attention if necessary.

## SECTION 9 PREPARATION DATE OF MSDS

**Prepared by:** Samuel, Son & Co. Ltd.

**Phone Number:** (905) 279-5460

**Date:** March, 1998