

# Handy & Harman of Canada, Limited

## MATERIAL SAFETY DATA SHEET

### SECTION 1 MATERIAL IDENTIFICATION AND USE CODE BA-1 rev 10/06

**MATERIAL NAME IDENTIFIER: EASY-FLO, TRIMET, BRAZE**

*Manufacturer's Name:* **HANDY & HARMAN OF CANADA, LIMITED** *Street Address:* **290 CARLINGVIEW DRIVE**

*City:* **REXDALE** *Province/State/Country:* **ONTARIO, CANADA M9W 5G1** *Emergency Phone No:* **(416) 675-1860**

*Supplier's Name:* *Street Address:*

*City:* *Province/State/Country:* *Emergency Phone No:*

<b>Chemical Name:</b> Silver Brazing Filler Metal	<b>Chemical Family:</b> Cadmium Silver Brazing Alloys	<b>Chemical Formula:</b> Refer To Chart
<b>Molecular Weight:</b> N/Avl.	<b>Trade Names, Synonyms:</b> Refer To Chart	<b>Material Use:</b> Filler Metals For Brazing

### SECTION 2 HAZARDOUS CHEMICAL COMPONENTS

Chemical Component	CAS Number	(Refer to filler metal chart below for nominal composition %)
SILVER (Ag)	7440-22-4	ACGIH: TLVs (2000) 0.1 mg/m <sup>3</sup> TWA (metal) OSHA PEL: 0.01 mg/m <sup>3</sup> TWA LD <sub>50</sub> N/Avl. <span style="float: right;">LC<sub>50</sub> N/Avl.</span>
COPPER (Cu)	7440-50-8	ACGIH: TLVs (2000) 0.2 mg/m <sup>3</sup> TWA (fume); 1.0 mg/m <sup>3</sup> TWA (dusts & mists) OSHA PELs: 0.1 mg/m <sup>3</sup> TWA (fume); 1.0 mg/m <sup>3</sup> TWA (dusts & mists) LD <sub>50</sub> 470 mg/kg oral-mouse <span style="float: right;">LC<sub>50</sub> N/Avl.</span>
ZINC (Zn)	7440-66-6	ACGIH: TLVs (2000) 5.0 mg/m <sup>3</sup> TWA as ZnO fume; 10.0 mg/m <sup>3</sup> STEL as ZnO fume 10.0 mg/m <sup>3</sup> TWA as ZnO dust OSHA PEL: 5.0 mg/m <sup>3</sup> TWA LD <sub>50</sub> 7950 oral-mouse <span style="float: right;">LC<sub>50</sub> N/Avl.</span>
CADMIUM (Cd)	7440-43-9	ACGIH: TLVs (2000) 0.01 mg/m <sup>3</sup> TWA; 0.002 mg/m <sup>3</sup> TWA (respirable fraction) OSHA PEL: (29CFR 1910.1027): .005 mg/m <sup>3</sup> TWA LD <sub>50</sub> 225 mg/kg oral-rat <span style="float: right;">LC<sub>50</sub> 25 gm/m<sup>3</sup>/30m inhal.-rat</span>
NICKEL (Ni)	7440-02-0	ACGIH: TLVs (2000) 1.5 mg/m <sup>3</sup> TWA (metal)(inhalable fraction); 0.2 mg/m <sup>3</sup> TWA (insoluble compounds, as Ni)(inhalable fraction) OSHA PEL: 1.0 mg/m <sup>3</sup> TWA metal & insoluble compounds as Ni LD <sub>50</sub> N/Avl. <span style="float: right;">LC<sub>50</sub> N/Avl.</span>
PHOSPHOROUS (P) (red allotropic form)	7723-14-0	ACGIH: TLVs N/Avl. OSHA PEL: N/Avl. LD <sub>50</sub> N/Avl. <span style="float: right;">LC<sub>50</sub> N/Avl.</span>

### HANDY & HARMAN BRAZING FILLER METALS CHART

FILLER METAL NAME	AWS / SFA CLASS	Nominal Composition, %					Solidus (Melt Point) °F °C	Liquidus (Flow Point) °F °C	Brazing Range		Specific Gravity
		Ag	Cu	Zn	Cd	Others			°F	°C	
EASY-FLO	B <sub>Ag</sub> -1a	50	15.5	16.5	18		1160-625	1175-635	1175-1375	635-745	9.45
EASY-FLO 3	B <sub>Ag</sub> -3	50	15.5	16.5	16	3Ni	1170-630	1270-690	1270-1400	690-760	9.52
TRIMET 258		1-2-1 ratio EASY-FLO 3, both sides of copper					1170-630	1270-690	1270-1400	690-760	9.22**
TRIMET 104		1-4-1 ratio EASY-FLO 3, both sides of copper					1170-630	1270-690	1270-1400	690-760	9.22**
EASY-FLO 45	B <sub>Ag</sub> -1	45	15	16	24		1125-605	1145-620	1145-1350	620-730	9.42
EASY-FLO 43		43	16	20	21		1125-605	1145-620	1145-1350	620-730	9.40
EASY-FLO 38		38	20	22	20		1125-605	1200-650	1200-1400	650-760	9.20
EASY-FLO 35	B <sub>Ag</sub> -2	35	26	21	18		1125-605	1295-700	1295-1400	700-760	9.18
EASY-FLO 30	B <sub>Ag</sub> -22	30	27	23	20		1125-605	1310-710	1310-1400	710-760	8.76
EASY-FLO 25	B <sub>Ag</sub> -27	25	35	26.5	13.5		1125-605	1375-745	1375-1400	745-760	8.94
EASY-FLO 25 HC	B <sub>Ag</sub> -33	25	30	27.5	17.5		1110-600	1315-715	1315-1400	715-760	8.90
BRAZE 053		5			95		640-340	740-395	740-900	395-480	8.82
BRAZE 056		5		16.6	78.4		480-250	600-315	600-850	315-455	8.55
BRAZE 440		44	27	13	15	1P	1100-595	1220-660	1220-1400	660-760	9.22

\*\*By Volume

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## MATERIAL SAFETY DATA SHEET

### SECTION 3

### PHYSICAL DATA

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**Physical State:** Gas  Liquid  Solid   
**Odour Threshold (ppm):** N/Avl.  
**Evaporation Rate:** Solid - N/Avl.  
**% Volatile (By Volume):** N/Avl.  
**Specific Gravity:** Refer To Chart

**Odour & Appearance:** No Odour; Solid Metal Wire, Strip, Powder, Paste  
**Vapour Pressure (mm.Hg):** N/Avl.      **Vapour Density (AIR=1):** Solid-N/Avl.  
**Boiling Point (°C):** Solid - N/Avl.      **Freezing Point (°C):** Solid - N/Avl.  
**Solubility In Water (20°C):** Insoluble      **pH:** N/Avl.  
**Coeff.-Water Oil Disp.:** N/Avl.

### SECTION 4

### FIRE AND EXPLOSION DATA

**Flammability:** Yes  No       **If yes, under which conditions?**  
 Dust, powder and fumes are flammable when exposed to flame or by chemical reaction with oxidizing agents (*see Section 5 for incompatible materials*). Fires or explosions involving these alloys will release potentially toxic emissions of metal or metal oxide fumes (*see Section 2 for hazardous components*).  
**Means Of Extinction:** Dry powder for metal fires. Do not use water on dust, powder or fume fires.  
**Special Procedures:** Use self-contained breathing apparatus with full face-piece operated in pressure demand or other positive pressure mode.  
**Flashpoint(°C) & Method:** Solid Metal - Non-Flammable      **Upper Explosion Limit (% By Volume):** N/Avl.  
**Lower Explosion Limit (%By Volume):** Solid Metal-N/Avl.      **Auto Ignition Temperature (°C):** Solid Metal - N/Avl.  
**TDG Flammability Classification:** None      **Hazardous Combustion Products:** Solid Metal - N/Avl.  
**Sensitivity To Impact Explosion Data:** N/Avl.      **Rate Of Burning:** N/Avl.  
**Explosive Power:** N/Avl.      **Sensitivity To Static Discharge:** N/Avl.

### SECTION 5

### REACTIVITY DATA

\*\*\*AVOID DISPERSION OF FINELY DIVIDED PARTICLES IN AIR\*\*\*

**Chemical Stability:** Yes  No       **If yes, under which conditions?** Normal Ambient Environment.  
**Incompatibility With Other Substances:** Yes  No       **If yes, which ones?**  
 Strong Oxidizers; Se; Te; Mg; Chlorates; NH<sub>3</sub>; HNO<sub>3</sub>; Azides; Ethanol; Ethylenimine; ClF<sub>3</sub>; Inorganic and Organic Peroxides; Peroxyformic Acid; Chlorine and Fluorine; Permonosulphuric Acid; CrO<sub>3</sub>; Mn and Ca Chlorides; CS<sub>2</sub>; Hydrazine Mononitrate; Nitrobenzene; Fe (CO)<sub>5</sub>; Seleninyl Bromide.  
**Reactivity And Under What Conditions:** Stable under normal temperatures and pressures.  
**Hazardous Decomposition Products:** Hazardous polymerization will not occur. Upon heating, danger is mostly from inhalation of cadmium (oxide) fumes. Dusts and fumes of cadmium affect the respiratory tract and may affect the kidneys. Severe overexposure can be fatal. Overexposure to elemental oxide fumes or dust can cause nausea and metal fume fever. Use hooded exhaust ventilation to carry all fumes away from work area and, if necessary, use air supplied respirator (*see Section 7*). Thought should be given to the heating methods, flux and base metals being joined which could emit fumes on heating depending on their particular chemistry.  
**Avoid overheating** (*see chart, Brazing Range*).

### SECTION 6

### TOXICOLOGICAL PROPERTIES

**Route Of Exposure:** **Inhalation** Inhalation of the components of these products are not known to present a significant risk to health when used according to instructions and with appropriate protective measures (*see Section 7*). Inhalation of the component/elements has been reported to cause one or more of the following symptoms/effects upon excessively high and/or prolonged inhalation/exposure.

<b>SILVER:</b>	<b>Acute</b>	May cause grey discoloration of mucous membranes.
	<b>Chronic</b>	May produce argyria, a permanent blue-grey discoloration of the skin, eyes, mucous membranes, and the respiratory tract.
<b>COPPER:</b>	<b>Acute</b>	Acute exposure to dust or fume may cause respiratory tract irritation, fever, muscle ache, chills, cough, weakness, and a metallic taste.
	<b>Chronic</b>	Exposure may cause damage to the liver, kidney, spleen, pancreas, and brain.
<b>ZINC:</b>	<b>Acute</b>	Exposure to zinc oxide fume may cause respiratory tract irritation and "metal fume fever", which is characterized by one or more of the following symptoms: metallic taste, dry throat, cough, chills, fever, tightness of chest, dyspnea, headache, nausea, vomiting, and fatigue.
	<b>Chronic</b>	Exposure unlikely.
<b>CADMIUM:</b>	<b>Acute</b>	Acute exposure to cadmium oxide fume by inhalation may produce pneumonitis, tracheobronchitis, and pulmonary edema.
	<b>Chronic</b>	Continued overexposure to cadmium (dust or fume) may produce gastrointestinal symptoms, anemia, rhinitis, discoloration of teeth, micro fractures, kidney disease and cancer.
<b>NICKEL</b>	<b>Acute</b>	Dust or fumes may produce headache, nausea, vertigo, asthma, and pulmonary edema.
	<b>Chronic</b>	May increase the risk of cancer to the nasopharynx, lungs, prostate, and kidney.
<b>PHOSPHOROUS:</b>	<b>Acute:</b>	When heated in air, fume is corrosive and irritating to eyes, nose, throat, and mucous membranes.
	<b>Chronic</b>	Unlikely.

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## MATERIAL SAFETY DATA SHEET

### SECTION 6 (cont'd)

### TOXICOLOGICAL PROPERTIES

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#### Miscellaneous Toxicological Information

**Cadmium** is regulated as a carcinogen by the Occupational Safety and Health Administration per 29CFR 1910.1027. It is also classified as a potential human carcinogen by the following organizations (with respective sub-classifications):

1. IARC (Group 1)
2. NTP (Groups 2A & 2B)

Cadmium has been found to cause reproductive abnormalities, including reduced birth weights, reduced viability, and behavioural alterations among offspring of female rodents. Male rodents exposed to Cadmium have been found to have testicular damage, reduction in sperm counts, and reduced fertility. Cadmium has also produced mutagenic effects in mammalian cell cultures.

**Nickel** is classified as a potential human carcinogen by the following organizations (with respective sub-classifications):

1. IARC (Group 2B)
2. NTP (Group 2B)

Nickel has also produced fetotoxic and teratogenic effects in animal studies, and mutagenic responses in mammalian cell cultures.

Neither Silver, Copper, Phosphorous, nor Zinc are classified as potential or demonstrated human carcinogens by IARC, NIOSH, NTP, OSHA, or ACGIH.

**Health Conditions Aggravated By Exposure:** Pre-existing pulmonary diseases (e.g., bronchitis, emphysema) may be aggravated by inhalation exposure to these materials, particularly as fume. Exposure to cadmium and nickel by inhalation and/or ingestion may aggravate pre-existing disease of the liver, kidneys, gastrointestinal system, central nervous system, and musculoskeletal system.

#### Route Of Exposure

**Skin:** In solid form, materials are not known to be hazardous. In finely divided form, skin contact may produce localized irritation, localized argyria, skin discolouration, and contact or allergic dermatitis.

**Eyes:** Exposure of the eyes to finely divided form of these materials may produce localized argyria, irritation, conjunctivitis, and ulceration of the cornea.

**Ingestion:** Finely divided form of these materials may produce gastric irritation, vomiting, abdominal pain, hemorrhage, and diarrhea. Long-term chronic ingestion may produce damage to the liver, kidney, spleen, pancreas, musculoskeletal system, blood-forming organs, and central nervous system.

<b>LD<sub>50</sub> Of Material - Specify Species And Route:</b> N/Avl.	<b>LC<sub>50</sub> Of Material Specify Species:</b> N/Avl.	<b>Exposure Limit Of Material:</b> N/Avl.	<b>Irritancy Of Material:</b> N/Avl.
<b>Sensitizing Capability Of Material:</b> N/Avl.	<b>Carcinogenicity Of Material:</b> N/Avl.	<b>Reproductive Effects Of Material:</b> N/Avl.	<b>Synergistic Materials:</b> N/Avl.

### SECTION 7

### PREVENTATIVE MEASURES

**Personal Protective Equipment:** Personal protective equipment will be required when using these materials. The nature of the processing activity will determine what form of equipment is necessary, i.e., safety glasses, respirator, protective clothing, etc. Personal protective equipment should not be substituted for proper handling and engineering controls to maintain exposure limits below applicable standards.

**Gloves:** Wear appropriate protective gloves to prevent injury from the hazards of brazing and/or repeated contact with finely divided material. Avoid flammable fabrics.

**Respiratory:** Local exhaust, mechanical ventilation, and/or respiratory equipment may be required to maintain a protection factor appropriate to the airborne concentrations of the contaminants generated and provide sufficient clean air for breathing. If exposure levels exceed OSHA PELs, wear a NIOSH/MSHA-approved respirator (or other approving authority) for protection from the airborne contaminants. All adjacent persons in the immediate vicinity of brazing or "soldering" operations shall be similarly protected as necessary by ventilation or approved respirators.

**Eyes:** Wear eye protection (safety glasses, dust-proof goggles) adequate to prevent eye contact with this material in finely divided form and to prevent eye injury from the hazards of brazing. Plastic-frame safety spectacles with side shields and filter lenses (shade #3 or #4) are recommended.

**Footwear:** Refer to workplace safety regulations.

**Clothing:** Avoid flammable fabrics. Wear appropriate clothing to prevent skin injuries from the hazards of brazing or handling powders.

**Other Protection:** Practice good housekeeping and personal hygiene procedures. To avoid ingestion of material, wash hands and face before eating, drinking, or using tobacco or cosmetics.

Brazing alloys may be used with a separately applied flux which, when heated, may emit irritating and/or toxic gases and fumes. Consult the MSDS for the specific flux in use to determine its hazards and appropriate protective measures. For general guidance, refer to American National Standards Institute (ANSI) Z49.1, "Safety in Welding and Cutting" (American Welding Society, Miami, FL 33135).

**Engineering Controls:** Adequate ventilation, sinks, showers, and eyewash stations should be provided. The best industrial control practice is to maintain concentrations of all chemical fumes and dusts as low as is practical.

**Leak And Spill Procedure:** If metal is molten, allow to solidify and cool. Clean up any spilled material so as to minimize dispersion of dusts. Wet sweeping or vacuuming using HEPA, or similarly approved filtration, are recommended methods.

**Waste Disposal:** Return to manufacturer for reclaim. **Sara Title III - Hazard Classes:** Acute Health Hazard; Chronic Health Hazard.

# Handy & Harman of Canada, Limited

## MATERIAL SAFETY DATA SHEET

### SECTION 7 (cont'd)

### PREVENTATIVE MEASURES

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**Handling Procedure And Equipment:** Avoid heating above brazing range (*see chart, Section 2*) as excessive fumes may result. (cadmium boils at 1409°F/765°C, zinc boils at 1665°F/910°C). Use sufficient flux or atmosphere to protect the metals and minimize oxidation/vapourization during use.

**Storage Requirements:** Avoid storage near incompatible materials (*see also Section 5*). Also avoid conditions which create toxic fumes or dusts. Wash exposed skin after handling material. Stable at room temperature.

**Special Shipping Information:** No special requirements.

**WHMIS Classification:** Class D, Division 1, Subdivision B.

### SECTION 8

### FIRST AID MEASURES

#### Emergency And First Aid Procedures

**Inhalation:** Move victim to fresh air at once. Give oxygen if breathing is laboured, artificial respiration if victim is not breathing. Keep person warm and quiet. Get medical attention immediately.

**Skin:** Contact in solid forms is not known to be hazardous. If clothing is contaminated with finely divided particles, remove. Wash affected area with large quantities of water for at least 5 minutes. Get medical attention if necessary.

**Eyes:** Flush immediately with large amounts of water for at least 15 minutes while lifting the lower and upper eyelids. If irritation continues, get medical attention.

**Ingestion:** If person is conscious, give large amounts of water and induce vomiting. Seek medical attention. If person is unconscious or convulsive, get immediate medical attention.

**\*\*\*SEEK MEDICAL ATTENTION IN ALL CASES OF EXPOSURE\*\*\***

#### SIGNS AND SYMPTOMS OF EXPOSURE:

#### Acute

**Inhalation:** Chills, fever, aching muscles, sneezing, dry throat, coughing, constriction of throat, nausea, irritation of nose and trachea, discolouration of mucous membranes, difficulty in breathing, chest pain, headache.

**Skin:** Particles may cause irritation, pain, nausea, vomiting.

**Eyes:** Particles may cause irritation, redness, itching.

**Ingestion:** Nausea, vomiting, headache, diarrhea, fever, and abdominal pain.

#### Chronic

**Inhalation:** Cough, difficulty in breathing, laryngitis, discolouration of mucous membranes, kidney and liver disorders.

**Skin:** May cause argaria, discolouration, contact dermatitis and/or allergic sensitization among hyper-susceptible individuals.

**Eyes:** Irritation. May cause, particularly in powder form, argaria, conjunctivitis, and/or ulceration of the cornea.

**Ingestion:** May cause damage to the liver, kidneys, musculoskeletal system and nervous system.

**Medical Conditions Generally Aggravated By Exposure:** (*see Section 6*).

**Sources Used:** Canadian Centre For Occupational Health And Safety, Hamilton, Ontario; American Welding Society, Miami, Florida; ACGIH, Cincinnati, Ohio; Lucas-Milhaupt Inc., Cudahy, Wisconsin.

**Additional Information:** The information contained herein is only for the manufactured product. The composition and hazards of any resultant fumes due to heating methods, filler metal alloy, flux and base metals employed may vary significantly.

Brazing fumes consist of various airborne substances that may create hazards to health when they are inhaled or swallowed. The degree of hazard to the worker(s) in the work area depends upon the composition of the total fume, the concentration of contaminants in the breathing air and the time-length of exposure to it. It is the responsibility of the user/employer to ensure the suitability of the material use and that TLV, TWA, and STEL values are not exceeded.

Assessment of the possible exposure to the worker(s) to hazardous fumes, when required, should be carried out by a competent person and may involve air concentration measurements.

### SECTION 9

### PREPARATION DATE OF MSDS

**PREPARED BY:**  
Marketing Department

**PHONE NO:**  
(416) 675-1860

**DATE:**  
Revised 10/06