SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: 97/3 Lead Free Solder
Product Size: ALL

Other means of identification
SDS number: 200000008621

Recommended use and restriction on use
Recommended use: Metal Soldering
Restrictions on use: Not known. Read this SDS before using this product.

Manufacturer/Importer/Supplier/Distributor Information

Company Name:	The Harris Products Group
Address:	4501 Quality Place Mason, OH 45040-1971 USA
Telephone:	+1 (513) 754-2000
Contact Person:	Safety Data Sheet Questions: custservmason@jwharris.com
Company Name:	The Lincoln Electric Company of Canada LP
Address:	179 Wicksteed Avenue Toronto, Ontario M4G 2B9 Canada
Telephone:	+1 (416) 421-2600
Contact Person:	Safety Data Sheet Questions: www.lincolnelectric.com/sds Arc Welding Safety Information: www.lincolnelectric.com/safety

Emergency telephone number:

USA/Canada/Mexico	+1 (888) 609-1762
Americas/Europe	+1 (216) 383-8962
Asia Pacific	+1 (216) 383-8966
Middle East/Africa	+1 (216) 383-8969

3E Company Access Code: 333988

2. HAZARDS IDENTIFICATION

Classified according to the criteria of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS), The United States Occupational Safety and Health Administration's Hazard Communication Standard (29 CFR 1910.1200), Canada's Hazardous Product Regulations and Mexico's Harmonized System for the Identification and Communication of Hazards and Risks from Hazardous Chemicals in the Workplace.

Hazard Classification Not classified as hazardous according to applicable GHS hazard classification criteria.

Label Elements

Hazard Symbol: No symbol

Signal Word: No signal word.

Hazard Statement: Not applicable

Precautionary Statements: Not applicable

Other hazards which do not result in GHS classification: Overexposure to fumes and gases from the solder and/or flux material can be hazardous. Read and understand the manufacturer's instructions, Safety Data Sheets and the precautionary labels before using this product.

Substance(s) formed under the conditions of use: Fumes produced from use of this product may contain the following constituent(s) and/or their complex metallic oxides as well as solid particles or other constituents from the solder, brazing consumable, flux material or base metal, or base metal coating not listed below.

Chemical Identity	CAS-No.
Carbon dioxide	124-38-9
Carbon monoxide	630-08-0
Nitrogen dioxide	10102-44-0
Ozone	10028-15-6

3. COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Ingredients
Mixtures

Chemical Identity	CAS number	Content in percent (%)*
Tin	7440-31-5	50 - <100%
Copper and/or copper alloys and compounds (as Cu)	7440-50-8	1 - <5%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Composition Comments: The term "Hazardous Ingredients" should be interpreted as a term defined in Hazard Communication standards and does not necessarily imply the existence of a welding hazard. The product may contain additional non-hazardous ingredients or may form additional compounds under the condition of use. Refer to Sections 2 and 8 for more information.

4. FIRST AID MEASURES

Ingestion: Avoid hand, clothing, food, and drink contact with fluxes, metal fume or powder which can cause ingestion of particulate during hand to mouth activities such as drinking, eating, smoking, etc. If ingested, do not induce vomiting. Contact a poison control center. Unless the poison control center advises otherwise, wash out mouth thoroughly with water. If symptoms develop, seek medical attention at once.

Inhalation: Move to fresh air if breathing is difficult. If breathing has stopped, perform artificial respiration and obtain medical assistance at once.

Skin Contact: Remove contaminated clothing and wash the skin thoroughly with soap and water. For reddened or blistered skin, or thermal burns, obtain medical assistance at once.

Eye contact: Do not rub eye. Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses. Continue to rinse for at least 15 minutes. Get medical attention promptly if symptoms occur after washing.

Most important symptoms/effects, acute and delayed

Symptoms:	Short-term (acute) overexposure to fumes and gases from welding and allied processes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Long-term (chronic) overexposure to fumes and gases from welding and allied processes can lead to siderosis (iron deposits in lung), central nervous system effects, bronchitis and other pulmonary effects. Refer to Section 11 for more information.
Hazards:	The hazards associated with welding and its allied processes such as soldering and brazing are complex and may include physical and health hazards such as but not limited to electric shock, physical strains, radiation burns (eye flash), thermal burns due to hot metal or spatter and potential health effects of overexposure to fumes, gases or dusts potentially generated during the use of this product. Refer to Section 11 for more information.

Indication of immediate medical attention and special treatment needed

Treatment:	Treat symptomatically.

5. FIRE-FIGHTING MEASURES

General Fire Hazards:	As shipped, this product is nonflammable. However, welding arc and sparks as well as open flames and hot surfaces associated with brazing and soldering can ignite combustible and flammable materials. Read and understand American National Standard Z49.1, "Safety in Welding, Cutting and Allied Processes" and National Fire Protection Association NFPA 51B, "Standard for Fire Prevention during Welding, Cutting and Other Hot Work" before using this product.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media:	Use fire-extinguishing media appropriate for surrounding materials.
Unsuitable extinguishing media:	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical:	During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters

Special fire fighting procedures:	Use standard firefighting procedures and consider the hazards of other involved materials.
Special protective equipment for fire-fighters:	Selection of respiratory protection for fire fighting: follow the general fire precautions indicated in the workplace. Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:	If airborne dust and/or fume is present, use adequate engineering controls and, if needed, personal protection to prevent overexposure. Refer to recommendations in Section 8.
Methods and material for containment and cleaning up:	Absorb with sand or other inert absorbent. Stop the flow of material, if this is without risk. Clean up spills immediately, observing precautions in the personal protective equipment in Section 8. Avoid generating dust. Prevent product from entering any drains, sewers or water sources. Refer to

Section 13 for proper disposal.

Environmental Precautions: Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Do not contaminate water sources or sewer. Environmental manager must be informed of all major spillages.

7. HANDLING AND STORAGE

Precautions for safe handling: Prevent abrading consumable materials or creating dust. Provide appropriate exhaust ventilation at places where fume or dust is formed. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Read and understand the manufacturer's instruction and the precautionary label on the product. See American National Standard Z49.1, "Safety In Welding, Cutting and Allied Processes" published by the American Welding Society, http://pubs.aws.org and OSHA Publication 2206 (29CFR1910), U.S. Government Printing Office, www.gpo.gov.

Conditions for safe storage, including any incompatibilities: Store in closed original container in a dry place. Store in accordance with local/regional/national regulations. Store away from incompatible materials.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control Parameters

Occupational Exposure Limits: US

Chemical Identity	Type	Exposure Limit Values	Source
Tin - as Sn	PEL	2 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	REL	2 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended (2005)
Tin	IDLH	100 mg/m3	US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values (10 2017)
Tin - Inhalable fraction.	TWA	2 mg/m3	US. ACGIH Threshold Limit Values, as amended (01 2019)
Copper and/or copper alloys and compounds (as Cu) - Dust and mist. - as Cu	TWA	1 mg/m3	US. ACGIH Threshold Limit Values, as amended (03 2014)
Copper and/or copper alloys and compounds (as Cu) - Fume. - as Cu	TWA	0.2 mg/m3	US. ACGIH Threshold Limit Values, as amended (03 2014)
	REL	0.1 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended (2016)
Copper and/or copper alloys and compounds (as Cu) - Dust and mist. - as Cu	REL	1 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended (2016)
Copper and/or copper alloys and compounds (as Cu) - Fume. - as Cu	PEL	0.1 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
Copper and/or copper alloys and compounds (as Cu) - Dust and mist. - as Cu	PEL	1 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
Copper and/or copper alloys and compounds (as Cu)	IDLH	100 mg/m3	US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values (10 2017)

Occupational Exposure Limits: Canada

Chemical Identity	Type	Exposure Limit Values	Source
Tin - as Sn	TWA	2 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table

			2), as amended (07 2009)
Tin	TWA	2 mg/m3	Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
Tin - as Sn	TWA	2 mg/m3	Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended (11 2010)
	8 HR ACL	2 mg/m3	Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended (05 2009)
	15 MIN ACL	4 mg/m3	Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended (05 2009)
Tin	TWA	2 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment), as amended (09 2017)
Tin - Inhalable fraction.	TWA	2 mg/m3	Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act), as amended (03 2019)
Copper and/or copper alloys and compounds (as Cu) - Fume.	TWA	0.2 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended (07 2009)
Copper and/or copper alloys and compounds (as Cu) - Dust and mist. - as Cu	TWA	1 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended (07 2009)
Copper and/or copper alloys and compounds (as Cu) - Fume. - as Cu	TWA	0.2 mg/m3	Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
Copper and/or copper alloys and compounds (as Cu) - Dust and mist. - as Cu	TWA	1 mg/m3	Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
	TWA	1 mg/m3	Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act), as amended (03 2014)
Copper and/or copper alloys and compounds (as Cu) - Fume. - as Cu	TWA	0.2 mg/m3	Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act), as amended (03 2014)
Copper and/or copper alloys and compounds (as Cu) - Dust and fume. - as Cu	TWA	1 mg/m3	Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended (06 2015)
Copper and/or copper alloys and compounds (as Cu) - Dust and mist. - as Cu	8 HR ACL	1 mg/m3	Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended (05 2009)
Copper and/or copper alloys and compounds (as Cu) - Fume. - as Cu	15 MIN ACL	0.6 mg/m3	Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended (05 2009)
Copper and/or copper alloys and compounds (as Cu) - Dust and mist. - as Cu	15 MIN ACL	3 mg/m3	Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended (05 2009)
Copper and/or copper alloys and compounds (as Cu) - Fume. - as Cu	8 HR ACL	0.2 mg/m3	Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended (05 2009)
Copper and/or copper alloys and compounds (as Cu) - Dust and mist. - as Cu	TWA	1 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment), as amended (09 2017)
Copper and/or copper alloys and compounds (as Cu) - Fume. - as Cu	TWA	0.2 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment), as amended (09

			2017)
	TWA	0.2 mg/m3	Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended (08 2017)

Occupational Exposure Limits: Mexico

Chemical Identity	Type	Exposure Limit Values	Source
Tin	VLE-PPT	2 mg/m3	Mexico. OELs. (NOM-010-STPS-2014 Chemical Pollutants at the Workplace; Assessment and Control), as amended (04 2014)
Copper and/or copper alloys and compounds (as Cu) - Fume. - as Cu	VLE-PPT	0.2 mg/m3	Mexico. OELs. (NOM-010-STPS-2014 Chemical Pollutants at the Workplace; Assessment and Control), as amended (04 2014)
Copper and/or copper alloys and compounds (as Cu) - Dust and mist. - as Cu	VLE-PPT	1 mg/m3	Mexico. OELs. (NOM-010-STPS-2014 Chemical Pollutants at the Workplace; Assessment and Control), as amended (04 2014)

Additional exposure limits under the conditions of use: US

Chemical Identity	Type	Exposure Limit Values		Source
Carbon dioxide	TWA	5,000 ppm		US. ACGIH Threshold Limit Values, as amended (12 2010)
	STEL	30,000 ppm		US. ACGIH Threshold Limit Values, as amended (12 2010)
	PEL	5,000 ppm	9,000 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	STEL	30,000 ppm	54,000 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended (2005)
	REL	5,000 ppm	9,000 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended (2005)
	IDLH	40,000 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values (10 2017)
Carbon monoxide	TWA	25 ppm		US. ACGIH Threshold Limit Values, as amended (12 2010)
	PEL	50 ppm	55 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	REL	35 ppm	40 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended (2005)
	Ceil_Time	200 ppm	229 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended (2005)
	IDLH	1,200 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values (10 2017)
Nitrogen dioxide	TWA	0.2 ppm		US. ACGIH Threshold Limit Values, as amended (02 2012)
	Ceiling	5 ppm	9 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	STEL	1 ppm	1.8 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended (2005)
	IDLH	20 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values (10 2017)
	IDLH	13 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values (10 2017)
Ozone	PEL	0.1 ppm	0.2 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	Ceil_Time	0.1 ppm	0.2 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended (2005)
	TWA	0.05 ppm		US. ACGIH Threshold Limit Values, as amended (03 2014)
	TWA	0.20 ppm		US. ACGIH Threshold Limit Values, as amended (03 2014)
	TWA	0.10 ppm		US. ACGIH Threshold Limit Values, as

			amended (03 2014)
	TWA	0.08 ppm	US. ACGIH Threshold Limit Values, as amended (03 2014)
	IDLH	5 ppm	US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values (10 2017)

Additional exposure limits under the conditions of use: Canada

Chemical Identity	Type	Exposure Limit Values		Source
Carbon dioxide	STEL	30,000 ppm	54,000 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended (07 2009)
	TWA	5,000 ppm	9,000 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended (07 2009)
	TWA	5,000 ppm		Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
	STEL	15,000 ppm		Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
	TWA	5,000 ppm		Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act), as amended (03 2011)
	STEL	30,000 ppm		Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act), as amended (03 2011)
	STEL	30,000 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended (11 2010)
	TWA	5,000 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended (11 2010)
	8 HR ACL	5,000 ppm		Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended (05 2009)
	15 MIN ACL	30,000 ppm		Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended (05 2009)
	TWA	5,000 ppm	9,000 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment), as amended (09 2017)
	STEL	30,000 ppm	54,000 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment), as amended (09 2017)
Carbon monoxide	TWA	25 ppm	29 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended (07 2009)
	TWA	25 ppm		Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
	STEL	100 ppm		Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
	TWA	25 ppm		Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act), as amended (03 2011)
	TWA	25 ppm		Canada. Ontario OELs. (Control of

				Exposure to Biological or Chemical Agents), as amended (07 2010)
	8 HR ACL	25 ppm		Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended (05 2009)
	15 MIN ACL	190 ppm		Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended (05 2009)
	TWA	35 ppm	40 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment), as amended (09 2017)
	STEL	200 ppm	230 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment), as amended (09 2017)
Nitrogen dioxide	STEL	5 ppm	9.4 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended (07 2009)
	TWA	3 ppm	5.6 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended (07 2009)
	CEILING	1 ppm		Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
	TWA	0.2 ppm		Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act), as amended (03 2012)
	STEL	5 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended (11 2010)
	TWA	3 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended (11 2010)
	8 HR ACL	3 ppm		Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended (05 2009)
	15 MIN ACL	5 ppm		Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended (05 2009)
	TWA	3 ppm	5.6 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment), as amended (09 2017)
Ozone	STEL	0.3 ppm	0.6 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended (07 2009)
	TWA	0.1 ppm	0.2 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended (07 2009)
	TWA	0.05 ppm		Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
	TWA	0.1 ppm		Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
	TWA	0.08 ppm		Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
	TWA	0.2 ppm		Canada. British Columbia OELs.

				(Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
	TWA	0.1 ppm	0.2 mg/m3	Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended (07 2010)
	STEL	0.3 ppm	0.6 mg/m3	Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended (07 2010)
	15 MIN ACL	0.15 ppm		Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended (05 2009)
	8 HR ACL	0.05 ppm		Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended (05 2009)
	CEILING	0.1 ppm	0.2 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment), as amended (12 2008)
	TWA	0.20 ppm		Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act), as amended (03 2014)
	TWA	0.05 ppm		Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act), as amended (03 2014)
	TWA	0.08 ppm		Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act), as amended (03 2014)
	TWA	0.10 ppm		Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act), as amended (03 2014)

Additional exposure limits under the conditions of use: Mexico

Chemical Identity	Type	Exposure Limit Values	Source
Carbon dioxide	VLE-CT	30,000 ppm	Mexico. OELs. (NOM-010-STPS-2014 Chemical Pollutants at the Workplace; Assessment and Control), as amended (04 2014)
	VLE-PPT	5,000 ppm	Mexico. OELs. (NOM-010-STPS-2014 Chemical Pollutants at the Workplace; Assessment and Control), as amended (04 2014)
Carbon monoxide	VLE-PPT	25 ppm	Mexico. OELs. (NOM-010-STPS-2014 Chemical Pollutants at the Workplace; Assessment and Control), as amended (04 2014)
Nitrogen dioxide	VLE-PPT	0.2 ppm	Mexico. OELs. (NOM-010-STPS-2014 Chemical Pollutants at the Workplace; Assessment and Control), as amended (04 2014)
Ozone	VLE-P	0.1 ppm	Mexico. OELs. (NOM-010-STPS-2014 Chemical Pollutants at the Workplace; Assessment and Control), as amended (04 2014)

Appropriate Engineering Controls

Ventilation: Use enough ventilation and local exhaust at the arc, flame or heat source to keep the fumes and gases from the worker's breathing zone and the general area. Train the operator to keep their head out of the fumes. **Keep exposure as low as possible.**

Individual protection measures, such as personal protective equipment

General information:

Exposure Guidelines: To reduce the potential for overexposure, use controls such as adequate ventilation and personal protective equipment (PPE). Overexposure refers to exceeding applicable local limits, the

	American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) or the Occupational Safety and Health Administration's (OSHA) Permissible Exposure Limits (PELs). Workplace exposure levels should be established by competent industrial hygiene assessments. Unless exposure levels are confirmed to be below the applicable local limit, TLV or PEL, whichever is lower, respirator use is required. Absent these controls, overexposure to one or more compound constituents, including those in the fume or airborne particles, may occur resulting in potential health hazards. According to the ACGIH, TLVs and Biological Exposure Indices (BEIs) "represent conditions under which ACGIH believes that nearly all workers may be repeatedly exposed without adverse health effects." The ACGIH further states that the TLV-TWA should be used as a guide in the control of health hazards and should not be used to indicate a fine line between safe and dangerous exposures. See Section 10 for information on constituents which have some potential to present health hazards. Welding consumables and materials being joined may contain chromium as an unintended trace element. Materials that contain chromium may produce some amount of hexavalent chromium (CrVI) and other chromium compounds as a byproduct in the fume. In 2018, the American Conference of Governmental Industrial Hygienists (ACGIH) lowered the Threshold Limit Value (TLV) for hexavalent chromium from 50 micrograms per cubic meter of air (50 µg/m³) to 0.2 µg/m³. At these new limits, CrVI exposures at or above the TLV may be possible in cases where adequate ventilation is not provided. CrVI compounds are on the IARC and NTP lists as posing a lung cancer and sinus cancer risk. Workplace conditions are unique and welding fume exposures levels vary. Workplace exposure assessments must be conducted by a qualified professional, such as an industrial hygienist, to determine if exposures are below applicable limits and to make recommendations when necessary for preventing overexposures.
Eye/face protection:	Wear helmet, face shield or eye protection with filter lens shade number 2 for torch soldering and 3-4 for torch brazing, and follow the recommendations as specified in ANSI Z49.1, Section 4, based on your process details. Shield others by providing appropriate screens and eye protection.
Skin Protection	
Hand Protection:	Wear protective gloves. Suitable gloves can be recommended by the glove supplier.
Other:	**Protective Clothing:** Wear hand, head, and body protection which help to prevent injury from radiation, open flames, hot surfaces, sparks and electrical shock. See Z49.1. At a minimum, this includes welder's gloves and a protective face shield when welding, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing when welding, brazing and soldering. Wear dry gloves free of holes or split seams. Train the operator not to permit electrically live parts or electrodes from contacting the skin . . . or clothing or gloves if they are wet. Insulate yourself from the work piece and ground using dry plywood, rubber mats or other dry insulation.
Respiratory Protection:	Keep your head out of fumes. Use enough ventilation and local exhaust to keep fumes and gases from your breathing zone and the general area. An approved respirator should be used unless exposure assessments are below applicable exposure limits.
Hygiene measures:	Do not eat, drink or smoke when using the product. Always observe good personal hygiene measures, such as washing after handling the material

and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, www.aws.org.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Soldering consumable.
Physical state:	Solid
Form:	Solid
Color:	No data available.
Odor:	No data available.
Odor threshold:	No data available.
pH:	No data available.
Melting point/freezing point:	No data available.
Initial boiling point and boiling range:	No data available.
Flash Point:	No data available.
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density:	No data available.
Density:	No data available.
Relative density:	No data available.
Solubility(ies)	
Solubility in water:	No data available.
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.

10. STABILITY AND REACTIVITY

Reactivity:	The product is non-reactive under normal conditions of use, storage and transport.
Chemical Stability:	Material is stable under normal conditions.
Possibility of hazardous reactions:	None under normal conditions.

Conditions to avoid:	Avoid heat or contamination.
Incompatible Materials:	Strong acids. Strong oxidizing substances. Strong bases.
Hazardous Decomposition Products:	Fumes and gases from welding and its allied processes such as brazing and soldering cannot be classified simply. The composition and quantity of both are dependent upon the metal to which the joining or hot work is applied, the process, procedure - and where applicable - the electrode or consumable used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded or worked (such as paint, plating, or galvanizing), the number of operators and the volume of the work area, the quality and amount of ventilation, the position of the operator's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.) In cases where an electrode or other applied material is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section 3, plus those from the base metal and coating, etc., as noted above. Reasonably expected fume constituents produced during arc welding and brazing include the oxides of iron, manganese and other metals present in the welding consumable or base metal. Hexavalent chromium compounds may be in the welding or brazing fume of consumables or base metals which contain chromium. Gaseous and particulate fluoride may be in the fume of consumables or flux materials which contain fluoride. Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc associated with welding.

11. TOXICOLOGICAL INFORMATION

General information:	The International Agency for Research on Cancer (IARC) has determined welding fumes and ultraviolet radiation from welding are carcinogenic to humans (Group 1). According to IARC, welding fumes cause cancer of the lung and positive associations have been observed with cancer of the kidney. Also according to IARC, ultraviolet radiation from welding causes ocular melanoma. IARC identifies gouging, brazing, carbon arc or plasma arc cutting, and soldering as processes closely related to welding. Read and understand the manufacturer’s instructions, Safety Data Sheets and the precautionary labels before using this product.

Information on likely routes of exposure

Inhalation:	Inhalation is the primary route of exposure. In high concentrations, dust, vapors, fumes or mists may irritate nose, throat and mucus membranes.
Skin Contact:	Moderately irritating to skin with prolonged exposure.
Eye contact:	HEAT RAYS (INFRARED RADIATION) from flame or hot metal can injure eyes.
Ingestion:	Avoid ingestion - wear gloves and other appropriate personal protection - wash hands thoroughly following use or handling.

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation: Short-term (acute) overexposure to fumes and gases from brazing and soldering may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Long-term (chronic) overexposure to fumes and gases from brazing and soldering can lead to siderosis (iron deposits in lung), central nervous system effects, bronchitis and other pulmonary effects. Products which contain lead or cadmium have additional specific health hazards - refer to Sections 2, 8 and 11 of this SDS.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral

Product: Not classified for acute toxicity based on available data.

Specified substance(s):

Copper and/or copper alloys and compounds (as Cu): LD 50 (Rat): 481 mg/kg

Dermal

Product: Not classified for acute toxicity based on available data.

Inhalation

Product: Not classified for acute toxicity based on available data.

Repeated dose toxicity

Product: No data available.

Skin Corrosion/Irritation

Product: Not classified

Serious Eye Damage/Eye Irritation

Product: Not classified

Respiratory or Skin Sensitization

Product: Respiratory Sensitization: Not classified
Skin Sensitization: Not classified

Carcinogenicity

Product: Not classified

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050), as amended:
No carcinogenic components identified

Germ Cell Mutagenicity

In vitro

Product: Not classified

In vivo

Product: Not classified

Reproductive toxicity

Product: Not classified

Specific Target Organ Toxicity - Single Exposure
Product: Not classified

Specific Target Organ Toxicity - Repeated Exposure
Product: Not classified

Aspiration Hazard
Product: Not applicable

Symptoms related to the physical, chemical and toxicological characteristics under the condition of use

Additional toxicological Information under the conditions of use:

Acute toxicity
Inhalation
Specified substance(s):

Carbon dioxide	LC Lo (Human, 5 min): 90000 ppm
Carbon monoxide	LC 50 (Rat, 4 h): 1300 ppm
Nitrogen dioxide	LC 50 (Rat, 4 h): 88 ppm
Ozone	LC Lo (Human, 30 min): 50 ppm

Other effects:
Specified substance(s):

Carbon dioxide	Asphyxia
Carbon monoxide	Carboxyhemoglobinemia
Nitrogen dioxide	Lower respiratory tract irritation

12. ECOLOGICAL INFORMATION

Ecotoxicity
Acute hazards to the aquatic environment:
Fish
Product: Not classified
Specified substance(s):

Copper and/or copper alloys and compounds (as Cu)	LC 50 (Fathead minnow (Pimephales promelas), 96 h): 1.6 mg/l

Aquatic Invertebrates
Product: Not classified
Specified substance(s):

Copper and/or copper alloys and compounds (as Cu)	EC 50 (Water flea (Daphnia magna), 48 h): 0.102 mg/l

Chronic hazards to the aquatic environment:
Fish
Product: Not classified

Aquatic Invertebrates
Product: Not classified

Toxicity to Aquatic Plants
Product: No data available.
Specified substance(s):

Copper and/or copper	LC 50 (Green algae (Scenedesmus dimorphus), 3 d): 0.0623 mg/l

alloys and compounds (as Cu)

Persistence and Degradability

Biodegradation

Product: No data available.

Bioaccumulative potential

Bioconcentration Factor (BCF)

Product: No data available.

Specified substance(s):

Copper and/or copper alloys and compounds (as Cu): Blue-green algae (Anacystis nidulans), Bioconcentration Factor (BCF): 36.01 (Static)

Mobility in soil: No data available.

13. Disposal considerations

General information: The generation of waste should be avoided or minimized whenever possible. When practical, recycle in an environmentally acceptable, regulatory compliant manner. Dispose of non-recyclable products in accordance with all applicable Federal, State, Provincial, and Local requirements.

Disposal instructions: Dispose of this material and its container to hazardous or special waste collection point.

Contaminated Packaging: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

14. TRANSPORT INFORMATION

DOT

UN Number:
UN Proper Shipping Name: NOT DG REGULATED
Transport Hazard Class(es)
Class: NR
Label(s): –
Packing Group: –
Marine Pollutant: No

IMDG

UN Number:
UN Proper Shipping Name: NOT DG REGULATED
Transport Hazard Class(es)
Class: NR
Label(s): –
EmS No.:
Packing Group: –
Marine Pollutant: No

IATA

UN Number:
Proper Shipping Name: NOT DG REGULATED
Transport Hazard Class(es):

Class:	NR
Label(s):	–
Packing Group:	–
Marine Pollutant:	No
Cargo aircraft only:	Allowed.

TDG

UN Number:	
UN Proper Shipping Name:	NOT DG REGULATED
Transport Hazard Class(es)	
Class:	NR
Label(s):	–
Packing Group:	–
Marine Pollutant:	No

15. REGULATORY INFORMATION

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

None present or none present in regulated quantities.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050), as amended

None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

Chemical Identity	Reportable quantity
Copper and/or copper alloys and compounds (as Cu)	5000lbs.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Not classified
Not classified

SARA 302 Extremely Hazardous Substance

None present or none present in regulated quantities.

SARA 304 Emergency Release Notification

Chemical Identity	Reportable quantity
Copper and/or copper alloys and compounds (as Cu)	5000 lbs.

SARA 311/312 Hazardous Chemical

Chemical Identity	Threshold Planning Quantity
Tin	10000 lbs
Copper and/or copper alloys and compounds (as Cu)	10000 lbs

SARA 313 (TRI Reporting)

Chemical Identity	Reporting threshold for other users	Reporting threshold for manufacturing and processing
Copper and/or copper alloys and compounds (as Cu)	10000 lbs	25000 lbs.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

None present or none present in regulated quantities.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
None present or none present in regulated quantities.

US State Regulations

US. California Proposition 65
No ingredient requiring a warning under CA Prop 65.

US. New Jersey Worker and Community Right-to-Know Act

Chemical Identity
Tin
Copper and/or copper alloys and compounds (as Cu)

US. Massachusetts RTK - Substance List
No ingredient regulated by MA Right-to-Know Law present.

US. Pennsylvania RTK - Hazardous Substances

Chemical Identity
Tin
Copper and/or copper alloys and compounds (as Cu)

US. Rhode Island RTK
No ingredient regulated by RI Right-to-Know Law present.

Canada Federal Regulations

List of Toxic Substances (CEPA, Schedule 1)
Not Regulated

Export Control List (CEPA 1999, Schedule 3)
Not Regulated

National Pollutant Release Inventory (NPRI)

Canada. National Pollutant Release Inventory (NPRI) Substances, Part 5, VOCs with Additional Reporting Requirements

NPRI PT5	Not Regulated

Canada. National Pollutant Release Inventory (NPRI) (Schedule 1, Parts 1-4)

NPRI	Not Regulated

Greenhouse Gases
Not Regulated

Controlled Drugs and Substances Act

CA CDSI	Not Regulated
CA CDSII	Not Regulated
CA CDSIII	Not Regulated
CA CDSIV	Not Regulated
CA CDSV	Not Regulated
CA CDSVII	Not Regulated
CA CDSVIII	Not Regulated

Precursor Control Regulations
Not Regulated

Mexico. Substances subject to reporting for the pollutant release and transfer registry (PRTR): Not applicable

Inventory Status:

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
EINECS, ELINCS or NLP:	On or in compliance with the inventory
Japan (ENCS) List:	One or more components are not listed or are exempt from listing.
China Inv. Existing Chemical Substances:	On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Canada NDSL Inventory:	One or more components are not listed or are exempt from listing.
Philippines PICCS:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Japan ISHL Listing:	One or more components are not listed or are exempt from listing.
Japan Pharmacopoeia Listing:	One or more components are not listed or are exempt from listing.
Mexico INSQ:	On or in compliance with the inventory
Ontario Inventory:	On or in compliance with the inventory
Taiwan Chemical Substance Inventory:	On or in compliance with the inventory

16. OTHER INFORMATION

Definitions:

Revision Date: 04/13/2020

Further Information: Additional information is available by request.

Disclaimer: The Lincoln Electric Company urges each end user and recipient of this SDS to study it carefully. See also www.lincolnelectric.com/safety. If necessary, consult an industrial hygienist or other expert to understand this information and safeguard the environment and protect workers from potential hazards associated with the handling or use of this product. This information is believed to be accurate as of the revision date shown above. However, no warranty, expressed or implied, is given. Because the conditions or methods of use are beyond Lincoln Electric's control, we assume no liability resulting from the use of this product. Regulatory requirements are subject to change and may differ between various locations. Compliance with all applicable Federal, State, Provincial, and local laws and regulations remain the responsibility of the user.

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