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SDS

**Common Name:** WATER SOLUBLE SOLDERING FLUX**Manufacturer:** HARRIS PRODUCTS GROUP**SDS Revision Date:** 11/2/2021**SDS Format:** No Format Specified**Item Number(s):** 1UYJ8, 1UYJ9**Manufacturer Model Number(s):**

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HARRIS (R\*)  
A LINCOLN ELECTRIC COMPANY

REVISION DATE: 11/02/2021

SAFETY DATA SHEET

### 1. PRODUCT AND COMPANY IDENTIFICATION



PRODUCT NAME: WATER SOLUBLE SOLDERING FLUX

OTHER MEANS OF IDENTIFICATION:  
SDS NUMBER: 200000008647

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:

HEALTH HAZARDS:  
SKIN CORROSION/IRRITATION: CATEGORY 1B  
SERIOUS EYE DAMAGE/EYE IRRITATION: CATEGORY 1

ENVIRONMENTAL HAZARDS:  
ACUTE HAZARDS TO THE AQUATIC ENVIRONMENT: CATEGORY 2  
CHRONIC HAZARDS TO THE AQUATIC ENVIRONMENT: CATEGORY 2

LABEL ELEMENTS:

HAZARD SYMBOL:  
CORROSION  
ENVIRONMENT

SIGNAL WORD: DANGER

HAZARD STATEMENT:  
CAUSES SEVERE SKIN BURNS AND EYE DAMAGE.  
TOXIC TO AQUATIC LIFE WITH LONG LASTING EFFECTS.

PRECAUTIONARY STATEMENTS:

PREVENTION:  
DO NOT BREATHE DUST/FUME/GAS/MIST/VAPORS/SPRAY. WASH FACE, HANDS AND ANY

EXPOSED SKIN THOROUGHLY AFTER HANDLING. AVOID RELEASE TO THE ENVIRONMENT.  
WEAR PROTECTIVE GLOVES/PROTECTIVE CLOTHING/EYE PROTECTION/FACE PROTECTION.

RESPONSE:

IF SWALLOWED: RINSE MOUTH. DO NOT INDUCE VOMITING.

IF ON SKIN (OR HAIR):

TAKE OFF IMMEDIATELY ALL CONTAMINATED CLOTHING. RINSE SKIN WITH WATER  
[OR SHOWER]. WASH CONTAMINATED CLOTHING BEFORE REUSE. SPECIFIC TREATMENT  
(SEE SUPPLEMENTAL FIRST AID INSTRUCTIONS ON THIS LABEL).

IF INHALED:

REMOVE PERSON TO FRESH AIR AND KEEP COMFORTABLE FOR BREATHING. IMMEDIATELY  
CALL A POISON CENTER/DOCTOR.

IF IN EYES:

RINSE CAUTIOUSLY WITH WATER FOR SEVERAL MINUTES. REMOVE CONTACT LENSES, IF  
PRESENT AND EASY TO DO. CONTINUE RINSING. COLLECT SPILLAGE.

STORAGE: STORE LOCKED UP.

DISPOSAL:

DISPOSE OF CONTENTS/CONTAINER TO AN APPROVED FACILITY IN ACCORDANCE WITH  
LOCAL, REGIONAL, NATIONAL AND INTERNATIONAL REGULATIONS.

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 (%) *
HYDROCHLORIC ACID	7647-01-0	1 - <3%
ZINC CHLORIDE	7646-85-7	1 - <3%

\* 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 OR ALLIED PROCESS 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. CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY. RINSE MOUTH. NEVER GIVE LIQUID TO AN UNCONSCIOUS PERSON. DO NOT INDUCE VOMITING WITHOUT ADVICE FROM POISON CONTROL CENTER.

##### INHALATION:

CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY. MOVE TO FRESH AIR. APPLY ARTIFICIAL RESPIRATION IF VICTIM IS NOT BREATHING IF BREATHING IS DIFFICULT, GIVE OXYGEN.

##### SKIN CONTACT:

CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY. IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CONTAMINATED CLOTHING BEFORE REUSE. DESTROY OR THOROUGHLY CLEAN CONTAMINATED SHOES.

##### EYE CONTACT:

IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. IF EASY TO DO, REMOVE CONTACT LENSES. CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY.

##### 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:  
SEE SECTION 8 OF THE SDS FOR PERSONAL PROTECTIVE EQUIPMENT. DO NOT TOUCH DAMAGED CONTAINERS OR SPILLED MATERIAL UNLESS WEARING APPROPRIATE PROTECTIVE CLOTHING. KEEP UNAUTHORIZED PERSONNEL AWAY.

METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP:

ABSORB SPILL WITH VERMICULITE OR OTHER INERT MATERIAL, THEN PLACE IN A CONTAINER FOR CHEMICAL WASTE. DIKE FAR AHEAD OF LARGER SPILL FOR LATER RECOVERY AND DISPOSAL.

NOTIFICATION PROCEDURES:

DIKE FOR LATER DISPOSAL. PREVENT ENTRY INTO WATERWAYS, SEWER, BASEMENTS OR CONFINED AREAS. STOP THE FLOW OF MATERIAL, IF THIS IS WITHOUT RISK.

ENVIRONMENTAL PRECAUTIONS:

AVOID RELEASE TO THE ENVIRONMENT. PREVENT FURTHER LEAKAGE OR SPILLAGE IF SAFE TO DO SO. DO NOT CONTAMINATE WATER SOURCES OR SEWER.

## 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](http://pubs.aws.org) AND OSHA PUBLICATION 2206 (29 CFR 1910), U.S. GOVERNMENT PRINTING OFFICE, [WWW.GPO.GOV](http://www.gpo.gov). DO NOT GET IN EYES. WASH HANDS THOROUGHLY AFTER HANDLING. DO NOT GET IN EYES, ON SKIN, ON CLOTHING.

CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES:

STORE LOCKED UP.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

## CONTROL PARAMETERS:

## OCCUPATIONAL EXPOSURE LIMITS: US

CHEMICAL IDENTITY	TYPE	EXPOSURE LIMIT VALUES	SOURCE
HYDROCHLORIC ACID	CEIL_TIME	5 PPM 7 MG/M3	US. NIOSH: POCKET GUIDE TO CHEMICAL HAZARDS, AS AMENDED (2005)
	CEILING	5 PPM 7 MG/M3	US. OSHA TABLE Z-1 LIMITS FOR AIR CONTAMINANTS (29 CFR 1910.1000) (02 2006)
	IDLH	50 PPM	US. NIOSH. IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) VALUES (10 2017)
ZINC CHLORIDE - FUME.	TWA	1 MG/M3	US. ACGIH THRESHOLD LIMIT VALUES (12 2010)
	STEL	2 MG/M3	US. ACGIH THRESHOLD LIMIT VALUES (12 2010)
	REL	1 MG/M3	US. NIOSH: POCKET GUIDE TO CHEMICAL HAZARDS, AS AMENDED (2005)
	STEL	2 MG/M3	US. NIOSH: POCKET GUIDE TO CHEMICAL HAZARDS, AS AMENDED (2005)
ZINC CHLORIDE	IDLH	50 MG/M3	US. NIOSH. IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) VALUES (10 2017)
ZINC CHLORIDE - FUME.	PEL	1 MG/M3	US. OSHA TABLE Z-1 LIMITS FOR AIR CONTAMINANTS (29 CFR 1910.1000) (02 2006)

## OCCUPATIONAL EXPOSURE LIMITS: CANADA

CHEMICAL IDENTITY	TYPE	EXPOSURE LIMIT VALUES	SOURCE
HYDROCHLORIC ACID	CEILING	2 PPM 3 MG/M3	CANADA. ALBERTA OELS (OCCUPATIONAL HEALTH & SAFETY CODE, SCHEDULE 1, TABLE 2), AS AMENDED (07 2009)
	CEILING	2 PPM	CANADA. BRITISH COLUMBIA OELS. (OCCUPATIONAL EXPOSURE LIMITS FOR CHEMICAL SUBSTANCES, OCCUPATIONAL HEALTH AND

SAFETY REGULATION 296/97,  
AS AMENDED) (07 2007)

	CEILING	2 PPM	CANADA. MANITOBA OELS (REG. 217/2006, THE WORKPLACE SAFETY AND HEALTH ACT), AS AMENDED (03 2011)
	CEV	2 PPM	CANADA. ONTARIO OELS. (CONTROL OF EXPOSURE TO BIOLOGICAL OR CHEMICAL AGENTS), AS AMENDED (07 2010)
	CEILING	2 PPM	CANADA. SASKATCHEWAN OELS (OCCUPATIONAL HEALTH AND SAFETY REGULATIONS, 1996, TABLE 21), AS AMENDED (05 2009)
ZINC CHLORIDE - FUME.	STEL	2 MG/M3	CANADA. ALBERTA OELS (OCCUPATIONAL HEALTH & SAFETY CODE, SCHEDULE 1, TABLE 2), AS AMENDED (07 2009)
	TWA	1 MG/M3	CANADA. ALBERTA OELS (OCCUPATIONAL HEALTH & SAFETY CODE, SCHEDULE 1, TABLE 2), AS AMENDED (07 2009)
	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)
	STEL	2 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 2011)
	STEL	2 MG/M3	CANADA. MANITOBA OELS (REG. 217/2006, THE WORKPLACE SAFETY AND HEALTH ACT), AS AMENDED (03 2011)
	TWA	1 MG/M3	CANADA. ONTARIO OELS. (CONTROL OF EXPOSURE TO BIOLOGICAL OR CHEMICAL AGENTS), AS AMENDED (07 2010)
	STEL	2 MG/M3	CANADA. ONTARIO OELS.

(CONTROL OF EXPOSURE TO BIOLOGICAL OR CHEMICAL AGENTS), AS AMENDED (07 2010)

8 HR ACL	1 MG/M3	CANADA. SASKATCHEWAN OELS (OCCUPATIONAL HEALTH AND SAFETY REGULATIONS, 1996, TABLE 21), AS AMENDED (05 2009)
15 MIN ACL	2 MG/M3	CANADA. SASKATCHEWAN OELS (OCCUPATIONAL HEALTH AND SAFETY REGULATIONS, 1996, TABLE 21), AS AMENDED (05 2009)
TWA	1 MG/M3	CANADA. QUEBEC OELS. (MINISTRY OF LABOR - REGULATION RESPECTING OCCUPATIONAL HEALTH AND SAFETY), AS AMENDED (09 2017)
STEL	2 MG/M3	CANADA. QUEBEC OELS. (MINISTRY OF LABOR - REGULATION RESPECTING OCCUPATIONAL HEALTH AND SAFETY), AS AMENDED (03 2020)

OCCUPATIONAL EXPOSURE LIMITS: MEXICO

CHEMICAL IDENTITY	TYPE	EXPOSURE LIMIT VALUES	SOURCE
HYDROCHLORIC ACID	VLE-P	2 PPM	MEXICO. OELS. (NOM-010-STPS-2014 CHEMICAL POLLUTANTS AT THE WORKPLACE; ASSESSMENT AND CONTROL), AS AMENDED (04 2014)
ZINC CHLORIDE - FUME.	VLE-CT	2 MG/M3	MEXICO. OELS. (NOM-010-STPS-2014 CHEMICAL POLLUTANTS AT THE WORKPLACE; ASSESSMENT AND CONTROL), AS AMENDED (04 2014)
	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 (12 2010)
	STEL	30,000 PPM	US. ACGIH THRESHOLD LIMIT VALUES (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 (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 (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 (03 2014)
TWA	0.10 PPM	US. ACGIH THRESHOLD LIMIT VALUES (03 2014)
TWA	0.08 PPM	US. ACGIH THRESHOLD LIMIT VALUES (03 2014)
IDLH	5 PPM	US. NIOSH. IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) VALUES (10 2017)
TWA	0.20 PPM	US. ACGIH THRESHOLD LIMIT VALUES (02 2020)

## 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 OCCUPATIONAL HEALTH AND SAFETY), AS AMENDED (09 2017)
	STEL	30,000 PPM 54,000 MG/M3	CANADA. QUEBEC OELS. (MINISTRY OF LABOR - REGULATION RESPECTING OCCUPATIONAL HEALTH AND SAFETY), 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 OCCUPATIONAL HEALTH AND SAFETY), AS AMENDED (09 2017)
	STEL	200 PPM 230 MG/M3	CANADA. QUEBEC OELS. (MINISTRY OF LABOR - REGULATION RESPECTING OCCUPATIONAL HEALTH AND SAFETY), 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 OCCUPATIONAL HEALTH AND SAFETY), 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

Grainger SDS Lookup

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 OCCUPATIONAL HEALTH AND SAFETY), AS AMENDED (12 2008)
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)
TWA	0.20 PPM	CANADA. MANITOBA OELS (REG. 217/2006, THE WORKPLACE SAFETY AND HEALTH ACT), AS AMENDED (02 2020)

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 (MICRO)G/M3) TO 0.2 (MICRO)G/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. GOOD GENERAL VENTILATION (TYPICALLY 10 AIR CHANGES PER HOUR) SHOULD BE USED. VENTILATION RATES SHOULD BE MATCHED TO CONDITIONS. IF APPLICABLE, USE PROCESS ENCLOSURES, LOCAL EXHAUST VENTILATION, OR OTHER ENGINEERING CONTROLS TO MAINTAIN AIRBORNE LEVELS BELOW RECOMMENDED EXPOSURE LIMITS. IF EXPOSURE LIMITS HAVE NOT BEEN ESTABLISHED, MAINTAIN AIRBORNE LEVELS TO AN ACCEPTABLE LEVEL. AN EYE WASH

AND SAFETY SHOWER MUST BE AVAILABLE IN THE IMMEDIATE WORK AREA.

**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. WEAR A FULL-FACE RESPIRATOR, IF NEEDED. WEAR SAFETY GLASSES WITH SIDE SHIELDS (OR GOGGLES) AND A FACE SHIELD.

**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. WEAR CHEMICAL-RESISTANT GLOVES, FOOTWEAR, AND PROTECTIVE CLOTHING APPROPRIATE FOR THE RISK OF EXPOSURE. CONTACT HEALTH AND SAFETY PROFESSIONAL OR MANUFACTURER FOR SPECIFIC INFORMATION.

**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. DO NOT GET IN EYES. OBSERVE GOOD INDUSTRIAL HYGIENE PRACTICES. WASH CONTAMINATED CLOTHING BEFORE REUSE. DO NOT GET THIS MATERIAL IN CONTACT WITH SKIN. WASH HANDS BEFORE BREAKS AND IMMEDIATELY AFTER HANDLING THE PRODUCT.

## 9. PHYSICAL AND CHEMICAL PROPERTIES



APPEARANCE: SOLDERING FLUX.

PHYSICAL STATE: PASTE

FORM: PASTE

COLOR: WHITE

ODOR: ODORLESS

ODOR THRESHOLD: NO DATA AVAILABLE.



PH: 2.08

MELTING POINT/FREEZING POINT: NO DATA AVAILABLE.

INITIAL BOILING POINT AND BOILING RANGE: NO DATA AVAILABLE.

FLASH POINT: NO DATA AVAILABLE.

EVAPORATION RATE: 0.6

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: 0.99 G/CM3

RELATIVE DENSITY: 0.99

SOLUBILITY(IES):

SOLUBILITY IN WATER: COMPLETELY SOLUBLE

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: CAUSES SEVERE SKIN BURNS.

#### EYE CONTACT:

CAUSES SERIOUS EYE DAMAGE. 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. DEPENDING ON SPECIFIC PRODUCT COMPOSITION, SOME PRODUCTS MAY PRODUCE HAZARDOUS CONCENTRATIONS OF AIRBORNE OXIDES OF

CADMIUM, LEAD, ZINC OR FLUORIDE COMPOUNDS. USE ADEQUATE VENTILATION AND RESPIRATORY PROTECTION DURING USE. AVOID BREATHING FUMES. AVOID INGESTION - WEAR GLOVES AND OTHER APPROPRIATE PERSONAL PROTECTION - WASH HANDS THOROUGHLY FOLLOWING USE OR HANDLING. INHALATION OF FUMES MAY CAUSE UPPER RESPIRATORY TRACT IRRITATION AND SYSTEMIC POISONING WITH EARLY SYMPTOMS INCLUDING HEADACHE, COUGHING, AND A METALLIC TASTE AS WELL AS METAL FUME FEVER. CHRONIC CADMIUM EXPOSURE CAUSES LUNG AND KIDNEY DAMAGE. CHRONIC EXPOSURE TO LEAD CAUSES DAMAGE TO LUNGS, LIVER, KIDNEY, NERVOUS SYSTEM AS WELL AS BLOOD AND MUSCULOSKELETAL DISORDERS. EXPOSURES TO HIGH LEVELS OF CADMIUM OR LEAD DUST OR FUME MAY BE IMMEDIATELY DANGEROUS TO LIFE OR HEALTH AND CAN CAUSE DELAYED PNEUMONITIS WITH FEVER AND CHEST PAIN, AND PULMONARY EDEMA RESULTING IN DEATH.

INFORMATION ON TOXICOLOGICAL EFFECTS:

ACUTE TOXICITY (LIST ALL POSSIBLE ROUTES OF EXPOSURE):

ORAL:

PRODUCT:

ATEMIX: 50,400 MG/KG

SPECIFIED SUBSTANCE(S):

ZINC CHLORIDE:

LD50 (MOUSE): 1,260 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: CAUSES SEVERE SKIN BURNS.

SERIOUS EYE DAMAGE/EYE IRRITATION:

PRODUCT: CAUSES SERIOUS EYE DAMAGE.

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: NO DATA AVAILABLE.

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:  
LCLO (HUMAN, 5 MIN): 90000 PPM

CARBON MONOXIDE:  
LC50 (RAT, 4 H): 1300 PPM

NITROGEN DIOXIDE:  
LC50 (RAT, 4 H): 88 PPM

OZONE:  
LCLO (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



GENERAL INFORMATION:  
CONTAINS A SUBSTANCE WHICH CAUSES RISK OF HAZARDOUS EFFECTS TO THE  
ENVIRONMENT.

ECOTOXICITY:

ACUTE HAZARDS TO THE AQUATIC ENVIRONMENT:

FISH:  
PRODUCT: TOXIC TO AQUATIC ORGANISMS.

SPECIFIED SUBSTANCE(S):

ZINC CHLORIDE:  
LC50 (RAINBOW TROUT, DONALDSON TROUT (ONCORHYNCHUS MYKISS), 96 H):  
1.85 - 2.55 MG/L

AQUATIC INVERTEBRATES:  
PRODUCT: TOXIC TO AQUATIC ORGANISMS.

## SPECIFIED SUBSTANCE(S) :

## ZINC CHLORIDE:

LC50 (DAPHNIA MAGNA, 48 H) : 100 (MICRO)G/L

## CHRONIC HAZARDS TO THE AQUATIC ENVIRONMENT:

## FISH:

## PRODUCT:

TOXIC TO AQUATIC ORGANISMS, MAY CAUSE LONG-TERM ADVERSE EFFECTS IN THE AQUATIC ENVIRONMENT.

## AQUATIC INVERTEBRATES:

## PRODUCT:

TOXIC TO AQUATIC ORGANISMS, MAY CAUSE LONG-TERM ADVERSE EFFECTS IN THE AQUATIC ENVIRONMENT.

## TOXICITY TO AQUATIC PLANTS:

PRODUCT: NO DATA AVAILABLE.

## PERSISTENCE AND DEGRADABILITY:

## BIODEGRADATION:

PRODUCT: NO DATA AVAILABLE.

## BIOACCUMULATIVE POTENTIAL:

## BIOCONCENTRATION FACTOR (BCF) :

PRODUCT: NO DATA AVAILABLE.

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:

DISCHARGE, TREATMENT, OR DISPOSAL MAY BE SUBJECT TO NATIONAL, STATE, OR LOCAL LAWS.

## 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 OR ID NUMBER:

UN PROPER SHIPPING NAME: NOT DG REGULATED

## TRANSPORT HAZARD CLASS(ES) :

CLASS: NR

LABEL(S) :

PACKING GROUP:

MARINE POLLUTANT: NO

IMDG:

UN NUMBER OR ID 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 OR ID 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 OR ID 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
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HYDROCHLORIC ACID	5000 LBS.
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ZINC CHLORIDE	1000 LBS.
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SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA):

HAZARD CATEGORIES:

IMMEDIATE (ACUTE) HEALTH HAZARDS

SKIN CORROSION OR IRRITATION

SERIOUS EYE DAMAGE OR EYE IRRITATION

SARA 302 EXTREMELY HAZARDOUS SUBSTANCE:

CHEMICAL IDENTITY	REPORTABLE QUANTITY	THRESHOLD PLANNING QUANTITY
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HYDROCHLORIC ACID	5000 LBS.	500 LBS.
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SARA 304 EMERGENCY RELEASE NOTIFICATION:

CHEMICAL IDENTITY	REPORTABLE QUANTITY
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HYDROCHLORIC ACID	5000 LBS.
-------------------	-----------

SARA 311/312 HAZARDOUS CHEMICAL:

CHEMICAL IDENTITY	THRESHOLD PLANNING QUANTITY
-------------------	-----------------------------

HYDROCHLORIC ACID	500 LBS
-------------------	---------

SARA 313 (TRI REPORTING):

CHEMICAL IDENTITY	REPORTING THRESHOLD FOR OTHER USERS	REPORTING THRESHOLD FOR MANUFACTURING AND PROCESSING
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HYDROCHLORIC ACID		25000 LBS.
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ZINC CHLORIDE	10000 LBS	25000 LBS.
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CLEAN WATER ACT SECTION 311 HAZARDOUS SUBSTANCES (40 CFR 117.3):

CHEMICAL IDENTITY	REPORTABLE QUANTITY
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HYDROCHLORIC ACID	REPORTABLE QUANTITY: 5000 LBS.
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ZINC CHLORIDE	REPORTABLE QUANTITY: 1000 LBS.
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CLEAN AIR ACT (CAA) SECTION 112(R) ACCIDENTAL RELEASE PREVENTION (40 CFR 68.130):

CHEMICAL IDENTITY	REPORTABLE QUANTITY
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HYDROCHLORIC ACID	15000 LBS
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HYDROCHLORIC ACID	5000 LBS
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US STATE REGULATIONS:

US. CALIFORNIA PROPOSITION 65:

NO INGREDIENT REQUIRING A WARNING UNDER CA PROP 65.

WARNING:

THIS PRODUCT CONTAINS OR PRODUCES A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS (OR OTHER REPRODUCTIVE HARM). (CALIFORNIA HEALTH & SAFETY CODE SECTION 25249.5 ET SEQ.)

WARNING: CANCER AND REPRODUCTIVE HARM - [WWW.P65WARNINGS.CA.GOV](http://WWW.P65WARNINGS.CA.GOV)

US. NEW JERSEY WORKER AND COMMUNITY RIGHT-TO-KNOW ACT:

CHEMICAL IDENTITY:

WATER

HYDROCHLORIC ACID

ZINC CHLORIDE

US. MASSACHUSETTS RTK - SUBSTANCE LIST:

CHEMICAL IDENTITY:

HYDROCHLORIC ACID  
ZINC CHLORIDE

US. PENNSYLVANIA RTK - HAZARDOUS SUBSTANCES:

CHEMICAL IDENTITY:  
HYDROCHLORIC ACID  
ZINC CHLORIDE

US. RHODE ISLAND RTK:

CHEMICAL IDENTITY:  
HYDROCHLORIC ACID  
ZINC CHLORIDE

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:

CHEMICAL IDENTITY: HYDROCHLORIC ACID

MEXICO. SUBSTANCES SUBJECT TO REPORTING FOR THE POLLUTANT RELEASE AND  
TRANSFER REGISTRY (PRTR): NOT APPLICABLE

INVENTORY STATUS:

AUSTRALIA AICS:

ONE OR MORE COMPONENTS ARE NOT LISTED OR ARE EXEMPT FROM LISTING.

CANADA DSL INVENTORY LIST:

ONE OR MORE COMPONENTS ARE NOT LISTED OR ARE EXEMPT FROM LISTING.

EINECS, ELINCS OR NLP:

ONE OR MORE COMPONENTS ARE NOT LISTED OR ARE EXEMPT FROM LISTING.

JAPAN (ENCS) LIST:

ONE OR MORE COMPONENTS ARE NOT LISTED OR ARE EXEMPT FROM LISTING.

CHINA INV. EXISTING CHEMICAL SUBSTANCES:

ONE OR MORE COMPONENTS ARE NOT LISTED OR ARE EXEMPT FROM LISTING.

KOREA EXISTING CHEMICALS INV. (KECI):

ONE OR MORE COMPONENTS ARE NOT LISTED OR ARE EXEMPT FROM LISTING.



## CANADA NDSL INVENTORY:

ONE OR MORE COMPONENTS ARE NOT LISTED OR ARE EXEMPT FROM LISTING.

## PHILIPPINES PICCS:

ONE OR MORE COMPONENTS ARE NOT LISTED OR ARE EXEMPT FROM LISTING.

## US TSCA INVENTORY:

ONE OR MORE COMPONENTS ARE NOT LISTED OR ARE EXEMPT FROM LISTING.

## NEW ZEALAND INVENTORY OF CHEMICALS:

ONE OR MORE COMPONENTS ARE NOT LISTED OR ARE EXEMPT FROM LISTING.

## 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:

ONE OR MORE COMPONENTS ARE NOT LISTED OR ARE EXEMPT FROM LISTING.

## ONTARIO INVENTORY:

ONE OR MORE COMPONENTS ARE NOT LISTED OR ARE EXEMPT FROM LISTING.

## TAIWAN CHEMICAL SUBSTANCE INVENTORY:

ONE OR MORE COMPONENTS ARE NOT LISTED OR ARE EXEMPT FROM LISTING.

**16. OTHER INFORMATION**

## DEFINITIONS:

REVISION DATE: 11/02/2021

FURTHER INFORMATION: ADDITIONAL INFORMATION IS AVAILABLE BY REQUEST.

## DISCLAIMER:

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