

**MATERIAL SAFETY DATA SHEET**  
**THIS MSDS IS EFFECTIVE AS OF JULY 31, 20069 AND SUPERSEDES**  
**ALL PREVIOUSLY ISSUED MATERIAL SAFETY DATA SHEETS**

**PRODUCT INFORMATION**

Product Name: **ARCTEC® #3 FLUX**  
 Use: Flux for Soft Soldering  
 Manufacturer/Processor/Importer : Arctec Alloys Limited  
 Supplier : Arctec Alloys Limited  
 Address : 4304 - 10 St. N.E., Calgary, Alberta, T2E 6K3  
 Emergency Tel : (403) 250-9355  
 PIN : N.A.P.

**IMPORTANT:** Conditions which can influence the composition and quantity of the fumes and gases to which workers may be exposed include amount of work, volume of work area, quality and amount of ventilation, position of welder'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.

The fume and gas decomposition products may be different in percent and form from the ingredients listed in Hazardous Ingredients. The decomposition products, not the ingredients in the flux, are important from a health standpoint. Decomposition products include those originating from the volatilization, reaction, and oxidization of the materials shown in Hazardous Ingredients as noted above. These components are virtually always present as complex compounds and not as metals.

**PHYSICAL DATA**

physical state : liquid	% volatiles by vol: N.A.P.
vapour density: N.A.P.	coef. of water/oil distribution: greater than 1
M.P. (degrees C) : N.A.V.	B.P. (degrees C) : > 102
evaporation rate : N.A.P.	specific gravity : 1.400
pH: less than 7 (acidic)	vapour pressure : 27.6 @ 20C
water solubility : soluble	odor threshold : N.A.P.
appearance, odor : clear, orange liquid, odorless	

**HAZARDOUS INGREDIENTS**

(Note: The term "hazardous" does not necessarily imply the existence of a hazard. It refers to ingredients which must be specified on material safety data sheets according to legislation.)

Ingredient	Percent Range %wt/wt	CAS #	LC50	LD50
Hydrochloric acid	10 - 30	7647-01-0	3124 ppm, 1 hr, inh, rat	900 mg/kg oral, rbt.
Ammonium chloride	7 - 13	12125-02-9	N.A.V.	1650 mg/kg oral, rat
Zinc chloride	15 - 40	7646-85-7	TCLO 4800 mg/m3 30 M, inh, man	350 mg/kg oral, rat
Water	40 - 70	N.A.V.	N.A.V.	N.A.V.

\*Variation within the ranges quoted does not alter the health and safety hazards reported for the material, nor controls recommended in this MSDS

**TABLE OF EXPOSURE LIMITS OF FUMES AND GASES**

Ingredient	Exposure Limits				
	TLV-TWA mg/m3	ACGIH TLV-STEL mg/m3	8 hr. mg/m3	15 min. mg/m3	ALBERTA OEL Ceiling mg/m3
Hydrogen chloride	*C 7	N.A.V.	N.A.V.	N.A.V.	7.5
Ammonium chloride (fume)	10	20	10	20	N.A.V.
Zinc chloride (fume)	1	2	1	2	N.A.V.
Zinc oxide (fume)	5	10	5	10	N.A.V.
Chlorine	3	9	3	8.7	8.7
Nitrogen dioxide	6	10	6	9.4	N.A.V.
Nitric oxide	30	N.A.V.	31	43	N.A.V.
Ammonia	18	27	17	24	N.A.V.

\* C denotes ceiling limit.

**FIRE AND EXPLOSION HAZARD**

flash point: N.A.P.	autoignition temp: N.A.P.
lower explosive limit (%): N.A.P.	upper explosive limit (%): N.A.P.
conditions of flammability: N.A.P.	extinguishing agents: as for surrounding fire
hazardous combustion products:	hydrogen chloride gas, ammonia, nitrogen oxides, chlorine, zinc oxide, zinc chloride fumes
sensitivity to mechanical impact: N.A.P.	sensitivity to static discharge: N.A.P.
oxidizing material: No	

**REACTIVITY**

Conditions of stability/reactivity:	product is stable at normal temperatures except as shown below.
Incompatible substances:	most metals, alkali or active metals, cyanides, halogenated compounds, oxidizers, organics, acids, bases, sulfides
Hazardous decomposition products:	hydrogen chloride gas, ammonia, nitrogen oxides, chlorine, zinc oxide, zinc chloride fumes

**STORAGE**

Store in cool, well ventilated area away from oxidizing materials, bases, and other incompatible chemicals.

### TOXICOLOGY - HEALTH EFFECTS

Inhalation: Exposure to mist and gases may result in irritation and congestion of nose, throat and lungs. Severe exposure may result in laryngeal spasm (choking) and/or delayed pulmonary oedema.

Ingestion: Severe burns to mouth, throat, and stomach. Pain, nausea, and vomiting may occur.

Eye: Mists, gases, and fumes may cause eye irritation and possible damage. Eye contact with liquid flux, flash, or sparks may cause eye damage.

Skin: Liquid contact may cause irritation of exposed skin and dermatitis. Skin burns may occur in severe cases.

### HANDLING AND SPECIAL PROTECTION

Handling procedures: Avoid inhalation of fumes, mists, and gases. Allow cleaning solvents to dry off work before welding. Thermal decomposition products of halogenated cleaning solvents may be highly poisonous.

Special Shipping information: TDG Classifications 8, 9.2. Packing Group II.

Special Provisions : No person shall offer for transport this product or substance in an intermodal portable tank when the concentration of the product or substance exceeds 36%.

Engineering Controls: Due to the toxicity of the fumes, natural or general dilution ventilation is not likely to provide adequate protection. Use effective LOCAL EXHAUST ventilation to remove fumes and gases at the source. Moveable local exhaust designs are available for use where welding must be performed in different locations in the shop. Effective ventilation is especially important in confined areas.

Respiratory Protection: Respiratory protection is required in the absence of effective ventilation. Use positive pressure air-line respirator or self-contained breathing apparatus when welding in confined spaces, or in other situations where oxygen deficiency or buildup of fume may occur. Elsewhere, air purifying respirators approved by NIOSH/MSHA for acid gases, toxic dusts, and fumes may be adequate. Check with Occupational Hygienist and CSA Standard Z94.4 for proper selection.

Eye Protection: Welding helmets or goggles with filter lenses in accordance with CSA standards must be worn.

Skin Protection: Flameproof gauntlet style gloves must be worn. Ear protection is recommended. Coveralls required. (Leather and wool are preferred materials for clothing.)

### SPILL AND DISPOSAL

Spill: Take up spill with sand or other absorbent material. Place into containers for disposal. Neutralize spill area with soda ash, then flush with water.

Disposal: Dispose of in accordance with applicable environmental regulations.

### ADDITIONAL INFORMATION

Not combustible, but contact with common metals produces hydrogen which may form explosive mixtures with air. Air monitoring for chlorine compounds should be performed if reason to believe that Occupational Exposure Limits may be exceeded.

WHMIS Classification: Class D, Division 2, Class E.

### FIRST AID

Inhalation: Remove worker to fresh air to prevent further exposure to fumes. In doing this, the rescuer should ensure his own safety by using suitable precautions, such as wearing protective clothing or respirator if necessary. Breathing and heart function must be maintained until medical attention arrives. Give artificial respiration if necessary. ADMINISTER CPR ONLY IF TRAINED. Get immediate medical attention. See Notes to Physician.

Ingestion: Do not induce vomiting. Give 2 or 3 glasses of water or milk to drink. Get medical attention immediately.

Eye Contact: For eye irritation caused by mists or gases: remove contact lenses if worn. Flush using a gentle stream of lukewarm, water for at least 15 minutes, opening upper and lower lids at intervals. Cover eye with a dry protective dressing. Get immediate medical attention. For "flash burns", sparks or molten metal in the eye: do not rub eye. Cover with a dry protective dressing. Get immediate medical attention.

Skin: Flush contaminated area with large amounts of water, then wash with mild soap and water. Apply a sterile dressing.

For thermal burns: If skin is not broken, immerse burn part in clean cold water or apply ice. Do not disturb blisters. Bandage loosely with a clean dry dressing. Get immediate medical attention.

Notes to Physician: As with exposure to any airborne materials which irritate lung tissue, the possibility of pulmonary oedema exists. Therefore, observe for several days after exposure. In case of illness, question worker as to whether base metal was painted, coated or had been cleaned with a halogenated solvent (thermal decomposition may produce phosgene).

**ABBREVIATIONS AND TERMS:**

<b>N.AP.</b>	Not Applicable
<b>N.AV.</b>	No Data Available
<b>CAS</b>	Chemical Abstracts Number
<b>TLV</b>	Threshold Limit Value: Airborne exposure limit recommended by the American Conference of Governmental Industrial Hygienists. Although widely adopted, these are recommended limits only.
<b>TLV-TWA</b>	Time-weighted Average concentration for a normal 8-hour workday and a 40 hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.
<b>TLV-STEL</b>	Threshold Limit Value - Short Term Exposure Limit is defined as a 15-minute time-weighted average exposure which should not be exceeded at any time during a work day even if the 8 hour time-weighted average is within the TLV.
<b>Alberta OEL</b>	Alberta Occupational Exposure Limit: Exposure limits for airborne contaminants specified in the Chemical Hazards Regulation (Alberta Reg. 8/82 and 242/83).
<b>8 hr. OEL</b>	8 hour Occupational Exposure Limit means the time-weighted average concentration of an airborne substance listed in Schedule A (of the Chemical Hazards Regulation) for an 8 hour period
<b>15 min. OEL</b>	15 minute Occupational Exposure Limit means the time-weighted average concentration of an airborne substance listed in Schedule A (of the Chemical Hazards Regulation) for a 15 minute period.
<b>Ceiling OEL</b>	Ceiling Occupational Exposure Limit means the maximum concentration of an airborne substance listed in Schedule A (of the Chemical Hazards Regulation).
<b>LD50</b>	Lethal Dose, 50 <sup>th</sup> percentile.
<b>LC50</b>	Lethal Concentration, 50 <sup>th</sup> percentile. (Note: The LD50 and LC50 indicate the short term toxicity of a chemical to test animals. The smaller the LD50 or LC50, the greater the toxicity.)
<b>LDLO</b>	Lowest Lethal Dose. Lowest dose demonstrated to cause death in prescribed species (animal or human).
<b>TCLO</b>	Lowest Toxic Dose. Lowest dose demonstrated to cause toxic effects in prescribed species (animal or human)

**PREPARATION INFORMATION**

MSDS prepared by;	Certified Industrial Hygiene Consulting Ltd., Calgary, Alberta, Canada. (403) 282-4208
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