





SAFETY DATA SHEET (SDS)

Aluminum

1	Identification
1.1	GHS product identifier Trade names: 440 S, 435 FC, 4043, 5356, 5554, 402, 430 Magnesium, AS 406, Pro 3028
1.2	Other means of identification: N. App.
1.3	Recommended use of the chemical and restriction on use: Used for gas metal arc welding, shielded metal arc welding, gas tungsten arc welding and oxyfuel welding, metal flame spray powder, as applicable. Do not weld near flammable or combustible materials.
1.4	Supplier: Arctec Alloys Limited 4304 - 10 St. N.E., Calgary, Alberta, T2E 6K3 Phone: (403) 250-9355
1.5	Emergency phone number: HealthLink 24/7 (Alberta Health Services): 800-624-2356 Out-of-province or internet phone users: 866-408-5465
2	Hazard(s) Identification
2.1	Classification of the substance or mixture: Class: Carcinogenicity Category: 1A Class: Germ Cell Mutagenicity Category: 1B Class: Specific Target Organ Toxicity – (repeated exposure) Category: 1 Target Organs: Lungs, Kidneys, Liver, Respiratory System, Nerves, Blood, Eyes, Skin  
2.2	GHS label elements: Signal Word: Danger Hazard Statements: H315 Causes skin irritation. H319 Causes serious eye irritation. H331 Toxic if inhaled. H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled. H340 May cause genetic defects. H350 May cause cancer. H372 Causes damage to organs through prolonged or repeated exposure. Precautionary Statements: P201 Obtain special instructions before use. P202 Do not handle until all safety precautions have been read and understood. P260 Do not breathe dust/fume/gas/mist/vapours/spray. P264 Wash hands thoroughly after handling. P270 Do not eat, drink or smoke when using this product. P272 Contaminated work clothing should not be allowed out of the workplace. P280 Wear protective gloves/protective clothing/eye protection/face protection. P283 Wear fire resistant or flame retardant clothing. P284 In case of inadequate ventilation wear respiratory protection. Response Statements: P308 + P313 If exposed or concerned, get medical advice/attention. P314 Get medical attention if you feel unwell.

	<p>P332 + P352 IF SKIN irritation occurs: Wash with plenty of water. P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. P337 + P313 If eye irritation persists: Get medical attention.</p>											
2.3	<p>Other hazards which do not result in classification: Persons with pacemakers should not go near welding or cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device. Heat: Spatter and melting metal can cause burn injuries and start fires. Radiation: Arc rays can severely damage eyes or skin. Electricity: Electric shock can kill.</p>											
3	Composition/Information on Ingredients											
	Chemical Name	SDS# and Weight %								CAS Number	EINECS Number	
		440S	435	4043	5356	5554	402	430	AS406	Pro 3028		
	Aluminum	60-100	60-100	60-100	60-100	60-100	60-100	3-7	1-5	5-10	7429-90-5	231-072-3
	Aluminum fluoride	1-11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7784-18-1	232-051-1
	Copper	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1-5	60-100	7440-50-8	231-159-6
	Iron	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1-5	7439-89-6	231-096-4
	Lithium fluoride	1-11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7789-24-4	232-152-0
	Magnesium	<0.1	<0.1	<0.1	1-5	1-5	<0.1	60-100	<0.1	<0.1	7439-95-4	231-104-6
	Magnesium fluoride	1-11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7783-40-6	231-995-1
	Potassium chloride	1-11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7447-40-7	231-211-8
	Potassium fluoride	1-11	0.1-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7789-23-3	232-151-5
	Silicon	1-11	1-10	3-7	<0.1	<0.1	7-13	<0.1	<0.1	<0.1	7439-98-7	231-107-2
	Sodium chloride	1-11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7647-14-5	231-598-3
	Zinc	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1-5	60-100	<0.1	7440-66-6	231-175-3
4	First Aid Measures											
4.1	Description of necessary first-aid measures:											
	Inhalation:	If breathing has stopped, perform artificial respiration. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Obtain emergency medical assistance immediately! If breathing is difficult, provide fresh air and call Poison Center/doctor.										
	Eye:	For radiation burns due to arc flash, see doctor. To remove dusts or fumes, flush cautiously with water for at least fifteen minutes. Remove contact lenses if present and easy to do. If irritation persists, see a doctor.										
	Skin:	For skin burns from arc radiation, promptly flush with cool water. Get medical attention for burns or irritations that persist. To remove dust or particles wash with water.										
	Ingestion:	Not applicable										
	Electric Shock:	Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live parts or wires. If not breathing, begin artificial respiration. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Obtain emergency medical assistance immediately!										
4.2	Most important symptoms/effects, acute and delayed: Asthma, chest pain, cough, wheezing, chest tightness.											
4.3	Indication of immediate medical attention and special treatment needed: Asthma, chest pain, cough, wheezing, chest tightness. For severe inhalation exposure, watch person for at least 48 hours in case pulmonary oedema develops.											
4.4	General: Move to fresh air and get medical assistance.											
5	Fire Fighting Measures											
5.1	Suitable extinguishing media: No specific recommendations for welding consumables. Welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning materials and fire situation.											
5.2	Specific hazards arising from the substance or mixture: Depends on burning materials. Smoke may contain toxic metal fumes such as copper and zinc from welding consumables.											
5.3	Special protective equipment or actions for fire-fighters: Wear self-contained breathing apparatus.											
6	Accidental Release Measures											
6.1	Personal precautions, protective equipment and emergency procedures: Refer to Section 8											

6.2	Environmental precautions: Refer to Section 13				
6.3	Methods and materials for containment and cleaning up: Place in suitable container for appropriate disposal.				
7	Handling and Storage				
7.1	Precautions for safe handling: Wear gloves when handling welding consumables. Avoid exposure to fume and dust. Retain all warning and identity labels.				
7.2	Conditions for safe storage, including any incompatibilities: Store in a dry place. Keep separate from chemical substances such as acids and strong bases, which could cause chemical reactions.				
7.3	Specific end use(s): Welding.				
8	Exposure Controls/Personal Protection				
8.1	Control parameters:				
Exposure limits: Use industrial hygiene monitoring equipment to ensure that exposures do not exceed applicable regulatory exposure limits (see below). ACGIH TLVs are recommended limits – not regulatory limits. Unless noted, all values apply to 8-hour time weighted average exposures (TWA).					
	Substance	CAS#	ACGIH TLV mg/m³	Alberta OEL mg/m³	BC EL mg/m³
	Aluminum - insoluble compounds	7429-90-5	1(R)	N.Av.	1(R)
	Aluminum metal	7429-90-5	1(R)	N.Av.	1(R)
	Aluminum oxide	1344-28-1	N.Av.	10	N.Av.
	Aluminum soluble compounds and alkyl	7429-90-5	N.Av.	2	N.Av.
	Copper (fume)	7439-89-6	0.2	0.2	0.2
	Fluoride	7789-75-5	2.5	2.5	2.5
	Hydrogen chloride	7647-01-0	3 (2 ppm) (C)	3 (2 ppm) (C)	3 (2 ppm) (C)
	Hydrogen fluoride, as F	7664-39-3	0.4 (0.5 ppm)	0.4 (0.5 ppm)	1.6 (2 ppm) (C)
	Iron oxide	1309-37-1	5(R)	5(R)	5
	Lithium hydride	7580-67-8	0.05 (C) (I)	0.025	0.025
	Magnesium oxide	1309-48-4	10 (I)	10	10 (I), 3 (R)
	Silica (amorphous fume)	69012-64-2	N.Av.	N.Av.	4.0, 1.5(R)
	Zinc chloride fume	7646-85-7	1	1	1
	Zinc oxide	1314-13-2	2 (R)	2 (R)	2 (R)
ACGIH TLVs: Threshold Limit Values according to American Conference of Governmental Industrial Hygienists. Alberta OELs: Alberta Occupational Exposure Limits BC ELs: British Columbia Exposure Limits (R) Respirable fraction, (I) Inhalable fraction. If no (R) or (I) designation is shown, values refer to total particulate.					
8.2	Appropriate engineering controls: Ensure sufficient local exhaust and general ventilation to keep exposures to welding fumes and gases below regulatory exposure limits. Use special care when welding painted or coated steels since hazardous substances from the coating may be emitted. If coating contains lead or mercury, remove before welding.				
8.3	Individual protection measures: Wear hand, head, eye, hearing and body protection such as welder's gloves, helmet or face shield with filter lens, ear muffs/plugs, safety boots, apron, arm and shoulder protection. Keep protective clothing clean and dry. Check condition of protective clothing and equipment on a regular basis. Use respiratory protection (P100 air purifying or supplied air respirator as appropriate) where ventilation is not sufficient to keep exposures below regulatory limits. Never use air purifying respirators in oxygen deficient atmospheres.				
9	Physical and Chemical Properties				
9.1	Information on basic physical and chemical properties:				
	Appearance, colour:	Solid (wire or rod), non-volatile with varying color.			
	Physical state:	Solid			
	Auto-ignition temperature:	Not available			
	Decomposition temperature:	Not available			
	Evaporation rate:	Not applicable			
	Explosive properties:	Not applicable			
	Flammability (solid, gas):	Not applicable			

	Flash point:	Not applicable		
	Initial boiling point and boiling range:	Not available		
	Melting point:	>1300 °C / >2300 °C		
	Freezing Point:	>1300 °C / >2300 °C		
	Odour:	None		
	Odour threshold:	Not applicable		
	Oxidising Properties:	Not applicable		
	Partition coefficient (n-octanol/water):	Not available		
	pH:	Not available		
	Relative density:	Not available		
	Solubility:	Not applicable		
	Upper / Lower flammability or explosive limits:	Not applicable		
	Vapour density:	Not applicable		
	Vapour pressure:	Not applicable		
	Viscosity:	Not applicable		
10	Stability and Reactivity			
10.1	Reactivity: May react with acids and strong bases producing gas.			
10.2	Chemical stability: This product is stable under normal conditions.			
10.3	Possibility of hazardous reactions: May react with acids and strong bases producing gas.			
10.4	Conditions to avoid: Wet, acids, bases			
10.5	Incompatible materials: Acids, bases			
10.6	Hazardous decomposition products: When this product is used in a welding process, hazardous decomposition products include those from the volatilization, reaction or oxidation of the materials listed in Section 2 and those from the base metal coating. Carbon oxides, nitrogen oxides and ozone may also be produced. Allow cleaning solvents to dry off work before welding. Thermal decomposition products of halogenated cleaning solvents may be highly poisonous. The amount of fumes generated from manual metal arc welding varies with welding parameters and dimensions, but is generally no more than 5 to 15 g/kg consumable.			
11	Toxicological Information			
11.1	Likely Routes of Exposure: <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Skin contact <input checked="" type="checkbox"/> Eye contact <input type="checkbox"/> Ingestion			
	Acute Toxicity: Overexposure to welding fumes can cause irritation of eyes, nose, throat and lungs. It may result in metal fume fever (chills, fever, upset stomach, vomiting, throat irritation, muscle aches), dizziness, nausea, dryness or irritation of the nose, throat, lungs and eyes. Airway restriction with tightening of chest and cough may occur. Excessive exposure may cause delayed pulmonary oedema (after 24-48 hours), which may be fatal.			
	Skin corrosion/irritation: Irritation			
	Serious eye damage/ irritation: Irritation			
	Respiratory and/or skin sensitization: Yes			
	Germ cell mutagenicity: Not available			
	Genotoxicity: Yes			
	Carcinogenicity: Yes			
	Reproductive toxicity: Yes			
	STOT – Single Exposure: Not available			
	STOT – Repeated Exposure: Yes – lungs and skin			
	Harmful if inhaled: Yes			
	Single exposure: Yes			
	Aspiration hazard: No			
	Repeated exposure: Yes			
	Interactive effects: Not available			
	Chemical Name	CAS Number	EINECS Number	LC50, inhalation, 4 Hours
	Aluminum	7429-90-5	231-072-3	N.Av.
				LD50, oral
				N.Av.

	Aluminum fluoride	7784-18-1	232-051-1	N.Av.	100 mg/kg, rat
	Copper	7440-50-8	231-159-6	N.Av.	472 mg/kg, rat
	Iron	7439-89-6	231-096-4	N.Av.	750 mg/kg, rat
	Lithium fluoride	7789-24-4	232-152-0	N.Av.	143 mg/kg, rat
	Magnesium	7439-95-4	231-104-6	N.Av.	8100 mg/kg, rat (magnesium chloride)
	Magnesium fluoride	7783-40-6	231-995-1	N.Av.	2330 mg/kg, rat
	Potassium chloride	7447-40-7	231-211-8	N.Av.	2600 mg/kg, rat
	Potassium fluoride	7789-23-3	232-151-5	N.Av.	245 mg/kg, rat
	Silicon	7439-98-7	231-107-2	N.Av.	3160 mg/kg, rat
	Sodium chloride	7647-14-5	231-598-3	>21000 mg/m ³ , rat, 4 H (based on conversion from 1 hour data)	3000 mg/kg, rat
	Zinc	7440-66-6	7440-66-6	N.Av.	650 mg/kg, rat
	Chronic Toxicity: Repeated exposure to welding fumes may cause a progressive lung disease (mixed-dust pneumoconiosis) which impairs breathing. Lung fibrosis has been reported in workers after long term aluminum exposure. Inhalation of copper fume may cause metal fume fever and nasal congestion, ulceration and perforation. Exposure to fluorides can cause eye, nose and throat irritation and fluorosis, a potentially crippling bone disease. Although inhalation of iron is not especially toxic in comparison to many other metals, it will deposit in the lungs possibly causing siderosis. This may lead to breathlessness, coughing and decreased lung function. Deposition can also occur in the eyes, and in some cases may lead to cataracts and night blindness. Silica fume may cause "ferro-alloy disease", which is characterized by recurrent fever over a period of 3 to 12 weeks. Lung damage may occur, but is thought not to progress further unlike silicosis produced by crystalline silica. Crystalline silica exposure can lead to progressive irreversible lung damage (silicosis) and increase the risk of lung cancer. Zinc fume exposure may cause metal fume fever with cough, chills, fever, shortness of breath, chest pain, nausea and vomiting.				
12	Ecological Information				
12.1	Toxicity: Not available				
12.2	Persistence and degradability: Not available				
12.3	Bioaccumulative potential: Not available				
12.4	Mobility in soil: Not available				
12.5	Results of PBT and vPvB assessment: Not available				
12.6	Other adverse effects: Not available				
12.7	Other: Welding consumables and materials could degrade / weather into components originating from the consumables or from the materials used in the welding process. Avoid exposure to conditions that could lead to accumulation in soils or groundwater.				
13	Disposal Considerations				
13.1	Disposal and waste treatment methods: Reuse or recycle where possible. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, provincial and local regulations. Use recycling procedures if available. USA RCRA: Residues from welding consumables and processes could degrade and accumulate in soils and groundwater.				
14	Transportation Information				
14.1	UN number: Not applicable				
14.2	UN proper shipping name: Not applicable				
14.3	Transport hazard class(es): Not applicable				
14.4	Packing group: Not applicable				
14.5	Environmental hazards: Not applicable				
14.6	Special precautions for user: Not applicable				
14.7	Transport in bulk according to Annex II of MARPOL and the IBC Code: Not applicable				
15	Regulatory Information				
15.1	Safety health and environmental regulations /legislation specific for the substance or mixture (applies to the airborne emissions during use).				

	<p>Canada: Class: Carcinogenicity Category: 1A Class: Germ Cell Mutagenicity Category: 1B Class: Specific Target Organ Toxicity – (repeated exposure) Category: 1 Target Organs: Lungs, Kidneys, Liver, Respiratory System, Nerves, Blood, Eyes, Skin Canadian Environmental Protection Act (CEPA): All constituents of this product are on the Domestic Substances List (DSL).</p>
	<p>USA: Under the OSHA Hazard Communication Standard, this product is considered hazardous. 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 § 25249.5 et seq.) United States EPA Toxic Substance Control Act: All constituents of this product are on the TSCA inventory list or are excluded from listing. CERCLA/SARA Title III Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs): Product is a solid solution in the form of a solid article. Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee. The following metallic components are listed as SARA 313 “Toxic Chemicals” and potentially subject to annual SARA 313 reporting: copper, 1.0%; zinc, 1.0%. See Section 3 for weight percent.</p>
15.2	<p>Other: Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label. Observe all applicable regulations. Take precautions when welding and protect yourself and others. WARNING: Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation. ELECTRIC SHOCK can kill. ARC RAYS and SPARKS can injure eyes and burn skin. Wear correct hand, head, eye and body protection.</p>
16	<p>Other Information</p>
16.1	<p>USA: American National Standard Z49.1. “Safety in Welding and Cutting”, ANSI/AWS F1.5. Methods for Sampling and analyzing Gases from Welding and Allied Processes., ANSI/AWS F1.1 “Method for Sampling Airborne Particles Generated by Welding and Allied Processes”, AWSF3.2M/F3.2 “Ventilation Guide for Weld Fume”, American Welding Society, 550 North Le Jeune Road, Miami Florida, 33135. Safety and Health Fact Sheets available from AWS at www.aws.org OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. American Conference of Governmental Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices, 6500 Glenway Ave., Cincinnati, Ohio 45211, USA. NFPA 51B “Standard for Fire Prevention During Welding, Cutting and Other Hot Work” published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169 Canada: CSA Standard CAN/CSA-W117.2-01 “Safety in Welding, Cutting and Allied Processes”</p>
16.2	<p>This SDS has been prepared by Arctec Alloys Limited based on information obtained from sources believed to be accurate and reliable. However, this information is provided without any representation or warranty, expressed or implied, regarding accuracy or completeness thereof. The conditions or methods of handling, storage, use and disposal of the product are beyond the control and knowledge of Arctec Alloys Limited. For this and other reasons Arctec Alloys Limited does not assume responsibility, and expressly disclaims liability for loss, damage or expense arising from it or in any way connected with the handling, storage, use or disposal of the product.</p>