



Safety Data Sheet

Rev. C – April 1, 2017

Section 1 - Identification

Product Identifier and Trade Names: Atlas Activator-CAN
Product Type: Activator
Application: Addition to Hydraulic Fracturing resins in cold temperature applications
Manufacturer's Name: Badger Mining Corporation
Manufacturer's Address: 409 South Church Street
Berlin, WI 54923
Manufacturer's Telephone: 24-Hour Telephone (715) 662 - 2400
Distributor – Canada: BMC-NRI
#45 61027 Hwy 672, Emerson Trail Industrial Park
Sexsmith, AB, T0H 3C0
Phone: (780) 568-2096

Section 2 - Hazards Identification

GHS Classification:

Category 2 Flammable Liquid
Category 2 Eye Irritation
Category 3 Specific Organ Toxicity Exposure Central Nervous System
Signal Word DANGER



Hazard Statements:

Highly flammable liquid and vapor.
Causes serious eye irritation.
May cause dizziness or drowsiness.

Precautionary Statements:

Keep away from heat/sparks/open flames/hot surfaces - No smoking.
Avoid breathing vapor and use only outdoors or in a well-ventilated area.
Keep container tightly closed and store in a cool and well-ventilated place. Ground/bond container and receiving equipment. Use explosion-proof electrical and ventilating equipment. Take precautionary measures against static discharge.
Wear protective gloves, and eye and face protection.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
If on skin (or hair): Immediately take off all contaminated clothing. Rinse with water/shower.
If in eyes: Rinse continuously with water for 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
Dispose of contents/container in accordance with local, regional, national, or international regulations.

Section 3 - Composition/Information on Ingredients

Hazardous Ingredients:

	<u>CAS #</u>	<u>Percent</u>
Isopropyl Alcohol (IPA)	67-63-0	40% to 50%
Alcohol Mixture		50% to 60%
containing		
Alcohols, C-9 to C-11, ethoxylated	68439-46-3	> 60%
Alcohols, C-9 to C-11	66455-17-2	1% to 10%

Section 4 - First Aid Measures

Inhalation - If inhalation occurs, remove the person to fresh air, perform artificial respiration as needed and obtain medical attention as needed.

Eye - Remove contact lenses if present and easy to do. Immediately flush eyes with running water for at least 15 minutes. Get immediate medical attention.

Skin - Wash skin thoroughly with solution of soap and water. Seek medical attention if irritation persists.

Ingestion - If accidentally swallowed, do not induce vomiting unless instructed to do so by medical personnel. Obtain immediate medical attention

Section 5 - Fire Fighting Measures

Extinguishing Media: Water spray, alcohol-resistant foam or carbon dioxide (CO₂) dry powder.

Unusual Fire and Explosion Habits: Vapors may travel a considerable distance to a point of ignition and flash back.

Special Fire Fighting Procedures: Fire Fighters should wear self-contained breathing apparatus. Cool containers with water spray until well after the fire is out. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams.

Hazardous Combustion Products: Incomplete combustion may produce carbon monoxide. Noxious and toxic vapors may be released during combustion.

Section 6 - Accidental Release Measures

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Persons involved in cleaning should first follow the precautions defined in Section 7 of the SDS. For small spills, dilute with water and mop up or absorb with an inert material and place in an appropriate waste disposal container. For large spills, keep away from heat and ignition sources. Stop leaks with non-combustible materials. Dispose of materials following local and federal requirements.

Personal Precautions: Wear appropriate personal protective equipment as specified in Section 8. Evacuate personnel to safe areas.

Environmental Precautions: Construct dike to prevent spreading.

Section 7 - Handling and Storage

Handling: Keep away from heat/sparks/open flames/hot surfaces. No smoking. Avoid breathing vapor and use only outdoors or in a well-ventilated area. Ground/bond container and receiving equipment. Use explosion-proof electrical and ventilating equipment. Wear eye protection/face protection.

Storage: Keep container tightly closed and store in a well-ventilated cool, dry place. Keep away from direct sunlight. Overheating of an ethoxylate stored under air should be avoided. Store at temperatures between 45° and 100° F. Avoid possible ignition source.

Section 8 - Exposure Controls/Personal Protection

Exposure Limits for Isopropanol (listed as 2-propanol by ACGIH):

Standard	Exposure Limits
OSHA PEL (8-Hour Time-Weighted Average)	400 ppm
ACGIH TLV (8-Hour Time-Weighted Average)	200 ppm
ACGIH STEL Short Term Exposure Limit	400 ppm
NIOSH REL (10-Hour Time-Weighted Average, 40-hour work week)	400 ppm
NIOSH STEL Short Term Exposure Limit	500 ppm

Exposure limits for ethoxylated alcohols: None established.

Exposure limits for C-9 to C-11 alcohols: None established.

Engineering Controls:

Use local exhaust as required to maintain exposures below the occupational exposure limits (OELs). Reference ACGIH, Industrial Ventilation - Recommended Practices. Ensure that eyewash stations and safety showers are proximal to the work location.

Respiratory Protection:

Consult OSHA and NIOSH for approved respiratory protection during use based on use and anticipated concentrations of contaminants that may be airborne. Respirator use must comply with applicable standards, which include provisions for a user training program, respirator maintenance and cleaning, respirator fit testing and other requirements.

Personnel Protection:

Chemical-resistant safety eyewear or goggles. Chemical-resistant gloves including neoprene, nitrile, rubber, or other impervious gloves can be worn where breakthrough times exceed the intended use period.

For Emergency Response:

Chemical-resistant suits, boots and gloves along with respirator protection may be required based on volume of material released. PPE should be selected based on OSHA standards or guidelines, and ANSI standards as they relate to selection, training and testing and use.

Section 9 - Physical and Chemical Properties

Appearance:	Clear, slightly amber liquid
Odor:	Pleasant mild odor resembling mixture of ethanol and acetone
Odor threshold:	22 ppm (IPA)
pH	5.8- 7.2 (alcohol mixture)
Boiling Point or Range:	87.6° C (189.7° F) for Atlas Activator-CAN
Melting point or Range:	-88.5° C (-127.3° F) for IPA, 2.22-15° C (36-59° F) for ethoxylated alcohols and -5-19° C (23-66.2° F) for C-9 to C-11 alcohols
Flash Point:	22.8° C (73° F) for Atlas Activator-CAN
Evaporation Rate:	For alcohol mixture, estimated to be slower than ether
Flammability:	Flammable Liquid
Upper/Lower Explosive Limit:	Upper 12.7%, Lower 2%(IPA) and not applicable for alcohol mixture
Vapor Pressure	4.4kPa @ 20° C (IPA) and 0.003 to 0.023 mm Hg @ 25° C (C-9 to C-11 Alcohols)
Vapor Density:	2.07 (Air =1) for IPA
Specific Gravity:	0.8751-0.8944
Solubility in Water:	Soluble (IPA), 19 to 140 mg/L in water @ 25° C (C-9 to C-11 Alcohols)
Partition coefficient: n-octanol/water	log K _{ow} = 0.05 (IPA) log K _{ow} = 3.77-4.72 (C-9 to C-11 Alcohols)
Auto ignition Temperature:	399°C (750.2°F) for IPA
Viscosity	200 centipoise @ 25° C for alcohol mixture

* Properties of C-9 to C-11 alcohols are based on 1-nonanol, 1-decanol and 1-undecanol

Section 10 - Stability and Reactivity

Chemical Stability:	Stable.
Reactivity:	Reactive violently with hydrogen and palladium combinations, nitrogen, oleum, aluminum triisopropoxide and oxidants.
Conditions to Avoid:	Contact with incompatible materials (see below).
Thermal Stability:	Heat, ignition sources and incompatible materials.
Incompatibility:	Strong oxidizing agents, such as fluorine, chlorine trifluoride, hydrogen fluoride, and oxygen difluoride, hydrogen peroxide, acetylene, ammonia, etc.
Hazardous Decomposition Products:	Carbon monoxide, carbon dioxide, aldehydes, flammable hydrocarbon fragments.
Hazardous Polymerization:	Not known to polymerize.

Section 11 - Toxicological Information

Potential Health Effects

Primary routes(s) of exposure: Inhalation Skin Ingestion

Inhalation: May cause nose, throat and lung irritation. Inhalation of vapors and/or aerosols at high concentrations may cause irritation of respiratory system.

Eye Contact: Causes severe eye irritation.

Skin Contact: Causes skin irritation.

Chronic Effects: Isopropanol can be toxic to the kidneys, liver and central nervous system in large doses. At high concentrations may cause headache, dizziness, drowsiness. Components not listed as a carcinogen by IARC or NTP.

Toxicity to Animals:

Isopropanol:

Acute oral LD50: 3600 mg/kg (mouse);

Acute dermal LD50: 12800 mg/kg (rabbit); and

Acute inhalation LC50: 72.6 mg/L (rat, estimated based on a 4 hour exposure).

Ethoxylated alcohols:

Acute oral LD50: > 2000 mg/kg (rat);

Acute dermal LD50: 2200 mg/kg (rat); and

LC50: Values exceed saturated vapor concentration in air. Alcohol ethoxylates were not acutely toxic to rats at concentrations less than or equal to their saturated vapor concentrations in air. Acute toxic thresholds were reached only when animals were exposed to the undiluted test chemical in the form of a respirable mist or aerosol. Under these conditions, 1- or 4-hour inhalation LC50 values ranged from 1.5 to 20.7 mg/L (rat).

C-9 to C-11 alcohols (based on 1-nonanol, 1-decanol and/or 1-undecanol):

Acute oral LD50: 3000 mg/kg to 4720 mg/kg(rat);

Acute dermal LD50: 2960 mg/kg to > 5000 mg/kg (rabbit); and

Acute inhalation LC50: 4 mg/L to 5.5 mg/L (mouse, estimated based on a 2-hour exposure).

Additional Toxicity Information: Based on animal studies, Isopropanol may cause reproductive effects including effects on fertility and developmental abnormalities and has been detected in maternal milk in humans.

Section 12 - Ecological Information

Ecological Effects: Isopropanol:

In water (LC50) 100,000 mg/L 96 hours and 64,000 mg/L 96 hours (fat head minnow).

Ethoxylated alcohols:

LC50 8.5 mg/L 96 hours (fat head minnow), EC50 5.3 mg/L 48 hours (daphnia magna).

Information on biodegradability and bioaccumulation not available.

Isopropanol: The product itself and its products of degradation are not toxic.

Section 13 - Disposal Considerations

General disposal according to local, state/provincial and federal requirements. Additional information concerning disposal can be obtained by contacting Badger Mining Corporation.

Section 14 - Transportation Information

U.S. Department of Transportation: Isopropanol classified as Class 3; Flammable liquid. Identification UN 1219 Packaging Group II.

Canadian Transportation of Dangerous Goods (TDG): Isopropanol classified as Class 3; Flammable liquid. Identification UN 1219 Packaging Group II.

Section 15 - Regulatory Information

As determined by review according to the requirements of OSHA Hazardous Communication Standard 29 CFR 1910.1200, this material presents possible health hazards. The OSHA Hazardous Communication Standard 29 CFR 1910.1200 and state and local worker or community "Right to Know" laws and regulations should be strictly followed. Provide training about the OSHA precautions. It is the user's responsibility to make available the SDS to employees and others who may handle or be exposed to this product. Instruct your employees to handle this product properly.

OTHER US REGULATORY INFORMATION:

SARA Title III: Section 312 – Acute toxicity health hazard. This product contains Isopropanol that is subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and 40 CFR 372:

TSCA: Isopropanol and ethoxylated alcohols are listed on TSCA Inventory.

California Proposition 65: Some ethoxylated alcohols may contain products known to the state of California to be a carcinogen.

CAS# 75-21-8 Chemical Name: Ethylene oxide
CAS # 75-07-0 Chemical Name: Acetaldehyde

Canadian Regulations: All information required by Controlled Products Regulation (CPR) is contained in the SDS. Product classified according to the hazard criteria of CPR.

WHMIS: CLASS B-2: Flammable Liquid and CLASS D 2B for Isopropanol

CEPA: All chemical substances listed on Domestic Substance List (DSL) or otherwise in compliance with CEPA new substance notification requirements.

Local, county, state/provincial or national emergency planning, right to know, or other laws, regulations or ordinances may apply. CONSULT APPLICABLE LAWS, REGULATIONS OR ORDINANCES.

Section 16 - Other Information

Definitions of Acronyms/Abbreviations:

ACGIH: American Conference of Governmental Industrial Hygienists

ANSI: American National Standards Institute

CAS: Chemical Abstracts Service

CEPA: Canadian Environmental Protection Agency

CFR: US Code of Federal Regulations

CO₂: Carbon Dioxide

CPR: Controlled Products Regulation

DSL: Domestic Substances List

EC50: Half Maximal Effective Concentration

GHS: Globally Harmonized System

IARC: International Agency for Research on Cancer

IPA: Isopropyl Alcohol

LC50: Lethal Concentration, 50%

Section 16 - Other Information, continued

LD50: Lethal Dose, 50%

NIOSH: National Institute for Occupational Safety and Health, US Department of Health and Human Services

NIOSH REL: NIOSH Recommended Exposure Limit

NTP: National Toxicology Program

OEL: Occupational Exposure Limit

OSHA: Occupational Safety and Health Administration, US Department of Labor

PEL: Permissible Exposure Limit

PPE: Personal Protective Equipment

SARA Title III: Title III of the Superfund Amendments and Reauthorization Act, 1986

SDS: Safety Data Sheet

STEL: Short-Term Exposure Limit

TDG: Transportation of Dangerous Goods

TLV: Threshold Limit Value

TSCA: Toxic Substance Control Act

WHMIS: Workplace Hazardous Materials Information System

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User's Responsibility: The OSHA Hazard Communication Standard 29 CFR 1910.1200 requires that this SDS be made available to your employees who handle or may be exposed to this product. Educate and train your employees regarding applicable precautions. Instruct your employees to handle this product properly.

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DATE OF PREPARATION 4/2017

REPLACES 10/2016