NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
U.S. DEPARTMENT OF COMMERCE

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SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

SRM Number: 2897a
SRM Name: Ethanol-Water Solution (Nominal Mass Fraction 2 %)
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is a solution of ethanol in water at a nominal concentration of 2 % by mass. This SRM is intended primarily for use in the calibration of instruments and techniques used for the determination of ethanol in water based media. A unit of SRM 2897a consists of five 10 mL ampoules, each containing approximately 10 mL of solution.

Company Information

National Institute of Standards and Technology
Standard Reference Materials Program
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2. HAZARDS IDENTIFICATION

Classification

Physical Hazard: Not classified.
Health Hazard: Not classified.

Label Elements

Symbol

Not applicable.

Signal Word

Not applicable.

Hazard Statement(s)

Not applicable.

Precautionary Statement(s)

Not applicable.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: Water ethanol solution

Other Designations:

Water: Dihydrogen oxide; hydrogen oxide; H_2O.
Ethanol: Ethyl alcohol; grain alcohol; ethyl hydroxide; ethyl hydrate; algrain; methyl carbinol; cologne spirits; fermentation alcohol; absolute alcohol; C_2H_5OH.

Components are listed in compliance with OSHA's 29 CFR 1910.1200; for the actual values see the Certificate of Analysis.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Ethanol	64-17-5	200-578-6	2
Non-Hazardous Component(s)			
Water	7732-18-5	231-791-2	98

4. First Aid Measures

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Rinse affected area with soap and water for at least 15 minutes. Seek medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

Ingestion: Contact a poison control center immediately for instructions. Give water to rinse out mouth. Never give liquids to a person with reduced awareness or becoming unconscious. If vomiting occurs, keep head lower than hips to prevent aspiration. If not breathing, give artificial respiration by qualified personnel. Seek immediate medical attention.

Most Important Symptoms/Effects, Acute and Delayed: Respiratory tract irritation, skin irritation, eye irritation, liver damage, and central nervous system depression.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek immediate medical attention.

5. Fire Fighting Measures

Fire and Explosion Hazards: Negligible fire hazard. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Regular dry chemical, carbon dioxide, fine water spray, and alcohol resistant foam.
Unsuitable: None listed.

Specific Hazards Arising from the Chemical: Thermal decomposition will form oxides of carbon.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Do not touch spilled material. Notify safety personnel of spills. Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Isolate hazard area and deny entry.

7. Handling and Storage

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection". Handle glass ampoules with care.

Storage: Store and handling in accordance with all current regulations and standards. Sealed ampoules, as received, should be stored in the dark at temperatures between 10 °C and 30 °C. Keep separated from incompatible substances (acids, bases, combustible materials, halo carbons, halogens, metal oxides, metal salts, metals, oxidizing materials, peroxides).

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

Component: Ethanol

OSHA (PEL):	1000 ppm TWA or 1900 mg/m^3 TWA
ACGIH (TLV):	1000 ppm STEL
NIOSH (REL):	1000 ppm TWA or 1900 mg/m^3 TWA
	3300 ppm IDLH (10 % LEL)

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties:

Appearance (physical state, color, etc.):	Colorless liquid
Molecular Formula:	not applicable
Molar Mass (g/mol):	not applicable
Odor:	not available
Odor threshold:	not available
pH:	not available
Evaporation rate:	not available
Melting point/freezing point (ºC):	0 (32 ºF) (water)
Relative Density (g/L):	not available
Specific Gravity	1
Vapor Pressure (mmHg):	17.5 (20 ºC) (water)
Vapor Density (air = 1):	not available
Viscosity (cP):	not available
Solubility(ies):	Miscible with alcohol
Partition coefficient (n-octanol/water):	not available
Particle Size (if relevant)	not applicable

Thermal Stability Properties:

Autoignition Temperature (ºC):	Not applicable
Thermal Decomposition (ºC):	not applicable
Initial boiling point and boiling range (ºC):	100 (212 ºF) (water)
Explosive Limits, LEL (Volume %):	Not applicable
Explosive Limits, UEL (Volume %):	Not applicable
Flash Point (ºC)	Not applicable
Flammability (solid, gas):	Not applicable

10. STABILITY AND REACTIVITY

Reactivity: Not reactive.

Stability: X Stable _____ Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

Incompatible Materials: Acids, bases, combustible materials, halo carbons, halogens, metal oxides, metal salts, metals, oxidizing materials, peroxides.

Fire/Explosion Information: See Section 5, “Fire Fighting Measures”.

Hazardous Decomposition: Thermal decomposition will produce oxides of carbon.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin X Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Respiratory tract irritation, skin irritation, eye irritation, narcosis.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Ethanol may cause irritation of mucous membranes, headache, drowsiness, fatigue, nervousness, dullness, narcosis, lack of concentration, somnolence, and symptoms of drunkenness. Reproductive effects have been reported in animals.

Skin Contact: Ethanol may cause irritation, mild redness and burning, sensitization, allergic, contact dermatitis. Chronic exposure to ethanol may result in defatting of the skin.

Eye Contact: Ethanol may cause irritation, conjunctivitis, and corneal cloudiness.

Ingestion: Ethanol short term exposure may cause headache, drowsiness, emotional lability, decreased inhibitions, exhilaration, boastfulness, talkativeness, remorse, belligerency, gradual visual impairment, muscular incoordination, slurring of speech, and symptoms of drunkenness; long term exposure may result in liver damage. Reproductive effects have been reported in animals.

Numerical Measures of Toxicity:

Acute Toxicity: Not classified.
Ethanol, Rat, Oral LD50: 7060 mg/kg
Ethanol, Rat, Inhalation LC50: 124.7 mg/L (4 h)

Skin Corrosion/Irritation: Not classified.
Ethanol, Rabbit skin, moderate: 20 mg (24 h)
Ethanol, Human skin: 70 %

Serious Eye damage/ Eye irritation: Not classified.
Ethanol, Rabbit eyes, mild: 500 mg (24 h)
Ethanol, Rabbit eyes, severe: 500 mg

Respiratory Sensitization: No data available.

Skin Sensitization: No data available.

Germ Cell Mutagenicity: Not classified.
Ethanol, Human: 15 mmol/L (24 h)
Ethanol, Human: 100 mmol/L (3 h)

Carcinogenicity: Not classified, this SRM is not for human consumption.
Listed as a Carcinogen/Potential Carcinogen ____ Yes X No
IARC lists ethanol (as related to alcoholic beverages) as Group 1 (carcinogenic to humans).

Reproductive Toxicity: Not classified.
Ethanol, Rat, Oral TDLo: 112 mg/kg (14 d)
Ethanol, Human, Oral TDLo (37 weeks pregnant): 250 mg/kg

Specific Target Organ Toxicity, Single Exposure: Not classified.

Specific Target Organ Toxicity, Repeated Exposure: Not classified.

Aspiration Hazard: No data available.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data:

Component: Ethanol

Fish:	Rainbow trout (*Oncorhynchus mykiss*) LC50 (static): 12.0 mg/L – 16.0 mL/L (96 h)
	Fathead minnow (*Pimephales promelas*) LC50 (static): >100 mg/L (96 h)
Invertebrate:	Freshwater water flea (*Daphnia magna*) EC50: 10 800 mg/L (24 h)

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Not regulated by DOT or IATA.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	No.
CHRONIC HEALTH:	No.
FIRE:	No.
REACTIVE:	No.
PRESSURE:	No.

State Regulations:

California Proposition 65: Warning!

This product contains a chemical (ethanol) known to the state of California to cause cancer.

This product contains a chemical (ethanol) known to the state of California to cause reproductive/developmental effects.

U.S. TSCA Inventory: Ethanol and water are listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations:

WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

Issue Date: 23 April 2025

Sources:

ChemAdvisor, Inc., MSDS, *Water*, 09 December 2015.

ChemAdvisor, Inc., MSDS, *Ethyl Alcohol*, *5 %*, 03 March 2013.

ChemAdvisor, Inc., MSDS, *Ethyl Alcohol*, 09 December 2015.

European Chemical Agency, *Ethanol, CAS No. 64-17-5*; available at https://echa.europa.eu/information-on-chemicals (accessed Aug 2020)

49 CFR 173.150, *U.S. Department of Transportation*, 2011.

IATA, *Dangerous Goods Regulations*, 2013.

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Level
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EC50	Effective Concentration, 50%	RM	Reference Material
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transport Association	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration, 50%	STEL	Short Term Exposure Level
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NIOSH	National Institute for Occupational Safety and Health	TWA	Time Weighted Average
NIST	National Institute of Standards and Technology	UEL	Upper Explosive Limit
		WHMIS	Workplace Hazardous Materials Information System

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