



a member of the Roche Group

Material Safety Data Sheet

Material Name: mRNA Copper

MSDS ID: VEN-178

***** Section 1 - Chemical Product and Company Identification*****

Manufacturer Information

VENTANA MEDICAL SYSTEMS INC.
1910 E. Innovation Park Drive
Tucson, AZ 85755
Phone: (520) 887-2155

EMERGENCY TELEPHONE NUMBER:
(800) 424-9300 (USA/Canada)
CHEMTREC: +1 (703) 527-3887 (International)

Material Name: mRNA Copper

Product Number(s)

06580181001, 253-4700, 06614353001, 760-224

Product Use

research

***** Section 2 - Hazards Identification*****

NFPA Ratings: Health: 1 Fire: 1 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Preparation

N; R: 51/53

Risks

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

EMERGENCY OVERVIEW

Color: colorless

Physical Form: liquid

Major Health Hazards: No significant target organ effects reported.

POTENTIAL HEALTH EFFECTS

Inhalation

Short Term: irritation

Long Term: irritation

Skin

Short Term: irritation

Long Term: irritation

Eye

Short Term: irritation

Long Term: irritation

Ingestion

Short Term: irritation

Long Term: irritation

OSHA Regulatory Status

This material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

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*** Section 3 - Composition/Information on Ingredients***

CAS #	Component / EU Number	Percent	Symbol(s)	Risk Phrase(s)
Not Available	NON-HAZARDOUS	60-100	---	---
64-19-7	ACETIC ACID 200-580-7	<1	C	R:10-35
7758-99-8	CUPRIC SULFATE PENTAHYDRATE	<1	Xn N	R:22-36/38-50/53

Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Copper compounds, n.o.s., Copper, inorganic compounds, Cupric sulfate (7758-98-7).

*** Section 4 - First Aid Measures***

Inhalation

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

Skin

Wash contaminated areas with soap and water. Thoroughly clean and dry contaminated clothing before reuse. Get medical attention, if needed.

Eyes

Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

Ingestion

If swallowed, get medical attention.

*** Section 5 - Fire-Fighting Measures***

See Section 9 for Flammability Properties

Flammable Properties

Slight fire hazard.

Extinguishing Media

carbon dioxide, regular dry chemical, regular foam, water

Unsuitable Extinguishing Media

None known.

Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

Fire Fighting Measures

Move container from fire area if it can be done without risk. Avoid inhalation of material or combustion by-products.

Hazardous Combustion Products

Thermal decomposition or combustion products: oxides of carbon, oxides of copper, oxides of sulfur

Sensitivity to Mechanical Impact

Not sensitive

Sensitivity to Static Discharge

Not sensitive

*** Section 6 - Accidental Release Measures***

Occupational Spill/Release

Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal.

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* * * Section 7 - Handling and Storage* * *
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Handling Procedures

Wash thoroughly after handling.

Storage Procedures

Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances.

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*** Section 8 - Exposure Controls/Personal Protection***

Exposure Limits

CUPRIC SULFATE PENTAHYDRATE (7758-99-8)

- ACGIH:** 1 mg/m³ TWA (as Cu, dust and mist, related to Copper compounds, n.o.s.)
- NIOSH:** 1 mg/m³ TWA (as Cu, dust and mist, related to Copper compounds, n.o.s.)
100 mg/m³ IDLH (as Cu, dust and mist, related to Copper compounds, n.o.s.)
- Austria:** 4 mg/m³ STEL (as Cu, inhalable fraction, 4 X 15 min); 0.4 mg/m³ STEL (as Cu, respirable fraction, smoke, 4 X 15 min, related to Copper compounds, n.o.s.)
1 mg/m³ TWA (as Cu, inhalable fraction); 0.1 mg/m³ TWA (as Cu, respirable fraction, smoke, related to Copper compounds, n.o.s.)
- Finland:** 1 mg/m³ TWA (as Cu)
- Germany (DFG):** 0.1 mg/m³ TWA MAK (inhalable fraction, related to Copper, inorganic compounds)
0.2 mg/m³ Peak (inhalable fraction, related to Copper, inorganic compounds)
- Japan:** Group 2 skin sensitizer (related to Copper compounds, n.o.s.)
- Sweden:** 1 mg/m³ LLV (as Cu, total dust); 0.2 mg/m³ LLV (as Cu, respirable dust, related to Copper, inorganic compounds)

ACETIC ACID (64-19-7)

- ACGIH:** 10 ppm TWA
15 ppm STEL
- NIOSH:** 10 ppm TWA; 25 mg/m³ TWA
15 ppm STEL; 37 mg/m³ STEL
50 ppm IDLH
- OSHA:** 10 ppm TWA; 25 mg/m³ TWA
10 ppm TWA; 25 mg/m³ TWA
- EEC:** 10 ppm TWA; 25 mg/m³ TWA
- Austria:** 20 ppm STEL (8 X 5 min); 50 mg/m³ STEL (8 X 5 min)
10 ppm TWA; 25 mg/m³ TWA
- Belgium:** 15 ppm STEL; 38 mg/m³ STEL
10 ppm TWA; 25 mg/m³ TWA
- Denmark:** 10 ppm TWA; 25 mg/m³ TWA
- Finland:** 10 ppm STEL; 25 mg/m³ STEL
5 ppm TWA; 13 mg/m³ TWA
- France:** 10 ppm STEL [VLCT]; 25 mg/m³ STEL [VLCT]
- Germany:** 10 ppm TWA AGW (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed, exposure factor 2); 25 mg/m³ TWA AGW (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed, exposure factor 2)
- Germany (DFG):** 10 ppm TWA MAK; 25 mg/m³ TWA MAK
20 ppm Peak; 50 mg/m³ Peak
- Greece:** 15 ppm STEL; 37 mg/m³ STEL
10 ppm TWA; 25 mg/m³ TWA
- Ireland:** 15 ppm STEL; 37 mg/m³ STEL
10 ppm TWA; 25 mg/m³ TWA
- Japan:** 10 ppm OEL; 25 mg/m³ OEL
- Portugal:** 10 ppm TWA [VLE-MP]
15 ppm STEL [VLE-CD]
- Spain:** 15 ppm STEL [VLA-EC]; 37 mg/m³ STEL [VLA-EC]
10 ppm TWA [VLA-ED]; 25 mg/m³ TWA [VLA-ED]
- Sweden:** 5 ppm LLV; 13 mg/m³ LLV
10 ppm STV; 25 mg/m³ STV

Ventilation

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Provide adequate ventilation. Ensure compliance with applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Eyes/Face

Safety glasses or goggles are recommended when there is a potential for eye contact. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Protective Clothing

Lab coat or apron.

Glove Recommendations

Wear appropriate chemical resistant gloves.

Respiratory Protection

No respirator is required under normal conditions of use.

*** Section 9 - Physical and Chemical Properties***

Physical State:	Liquid	Appearance:	colorless
Color:	colorless	Physical Form:	liquid
Odor:	Not available	Odor Threshold:	Not available
pH:	7	Melting/Freezing Point:	Not available
Boiling Point:	Not available	Decomposition:	Not available
Flash Point:	not flammable	Evaporation Rate:	Not available
LEL:	Not available	UEL:	Not available
Vapor Pressure:	Not available	Vapor Density (air = 1):	Not available
Density:	Not available	Specific Gravity (water = 1):	Not available
Water Solubility:	miscible	Log KOW:	Not available
Coeff. Water/Oil Dist.:	Not available	Auto Ignition:	Not available
Viscosity:	Not available	Volatility:	Not available

*** Section 10 - Stability and Reactivity***

Chemical Stability

Stable at normal temperatures and pressure.

Conditions to Avoid

Avoid heat, flames, sparks and other sources of ignition. Avoid contact with incompatible materials.

Materials to Avoid

oxidizing materials

Decomposition Products

Thermal decomposition or combustion products: oxides of carbon, oxides of copper, oxides of sulfur

Possibility of Hazardous Reactions

Will not polymerize.

*** Section 11 - Toxicological Information***

Acute and Chronic Toxicity

Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and the following selected endpoints are published:

CUPRIC SULFATE PENTAHYDRATE (7758-99-8)

Oral LD50 Rat 300 mg/kg; Dermal LD50 Rat >2 g/kg

ACETIC ACID (64-19-7)

Inhalation LC50 Rat 11.4 mg/L 4 h; Oral LD50 Rat 3310 mg/kg; Dermal LD50 Rabbit 1060 mg/kg

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RTECS Acute Toxicity (selected)

The components of this material have been reviewed, and RTECS publishes the following endpoints:

CUPRIC SULFATE PENTAHYDRATE (7758-99-8)

Oral: 300 mg/kg Oral Rat LD50

ACETIC ACID (64-19-7)

Inhalation: 11000 mg/m³/4 hour Inhalation Rat LC50

Oral: 3310 mg/kg Oral Rat LD50

Skin: 1060 uL/kg Skin Rabbit LD50; 1060 mg/kg Skin Rabbit LD50

Acute Toxicity Level

CUPRIC SULFATE PENTAHYDRATE (7758-99-8)

Toxic: ingestion

ACETIC ACID (64-19-7)

Toxic: inhalation

Moderately Toxic: dermal absorption, ingestion

Irritation/Corrosivity

RTECS Irritation

The components of this material have been reviewed, and RTECS publishes the following endpoints:

ACETIC ACID (64-19-7)

50 mg/24 hour Skin Human mild; 5 mg/30 second(s) Eyes Rabbit mild; 50 mg/24 hour Skin Rabbit mild; 525 mg/open Skin Rabbit severe

Local Effects

CUPRIC SULFATE PENTAHYDRATE (7758-99-8)

Irritant: inhalation, skin

Corrosive: eye, ingestion

ACETIC ACID (64-19-7)

Corrosive: inhalation, skin, eye, ingestion

Carcinogenicity

Component Carcinogenicity

None of the substances in this preparation are listed by ACGIH, OSHA, NIOSH, NTP, IARC, Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, or United Kingdom.

Mutagenic

No data available for the mixture.

RTECS Mutagenic

The components of this material have been reviewed, and RTECS publishes data for one or more components.

Reproductive Effects

No data available for the mixture.

RTECS Reproductive Effects

The components of this material have been reviewed, and RTECS publishes data for one or more components.

Tumorigenic

No data available for the mixture.

RTECS Tumorigenic

The components of this material have been reviewed, and RTECS publishes data for one or more components.

Medical Conditions Aggravated by Exposure

None known.

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*** Section 12 - Ecological Information***

Ecotoxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component Analysis - Aquatic Toxicity

CUPRIC SULFATE PENTAHYDRATE (7758-99-8)

Fish: 96 Hr LC50 Lepomis macrochirus: 0.66-1.15 mg/L [semi-static]; 96 Hr LC50 Lepomis macrochirus: 0.96-1.8 mg/L [static]; 96 Hr LC50 Oncorhynchus mykiss: 0.1478-0.165 mg/L [flow-through]; 96 Hr LC50 Oncorhynchus mykiss: 0.09-0.19 mg/L [static]; 96 Hr LC50 Pimephales promelas: 0.6752 mg/L [static]

Invertebrate: 48 Hr EC50 Daphnia magna: 0.147 - 0.227 mg/L [Static]

ACETIC ACID (64-19-7)

Fish: 96 Hr LC50 Pimephales promelas: 79 mg/L [static]; 96 Hr LC50 Lepomis macrochirus: 75 mg/L [static]

Invertebrate: 24 Hr EC50 Daphnia magna: 47 mg/L; 48 Hr EC50 Daphnia magna: 65 mg/L [Static]

Mobility

No data available for the mixture.

Persistence & Degradation

No data available for the mixture.

Bioaccumulative Potential

No data available for the mixture.

*** Section 13 - Disposal Considerations***

Disposal Methods

Dispose in accordance with all applicable regulations.

Component Waste Numbers

The U.S. EPA has not published waste numbers for this product's components.

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*** Section 14 - Transport Information ***

US DOT Information

Not regulated.

TDG Information

Not regulated.

ADR Information

Not regulated.

RID Information

Not regulated.

IATA Information

Not regulated.

ICAO Information

Not regulated.

IMDG Information

Not regulated.

*** Section 15 - Regulatory Information ***

U.S. Federal Regulations

This material contains one or more of the following chemicals required to be identified under SARA Sections 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

CUPRIC SULFATE PENTAHYDRATE (7758-99-8)

SARA 313: 1.0 % de minimis concentration (This category does not include CAS numbers 147-14-8, 1328-53-6, or 14302-13-7, or copper phthalocyanine compounds that are substituted with only hydrogen and/or chlorine and/or bromine., related to Copper compounds, n.o.s.)

CERCLA: 10 lb final RQ; 4.54 kg final RQ (related to Cupric sulfate)

ACETIC ACID (64-19-7)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

SARA 311/312

Acute Health: No **Chronic Health:** No **Fire:** No **Pressure:** No **Reactive:** No

U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component / EC Number	CAS	CA	MA	MN	NJ	PA
CUPRIC SULFATE PENTAHYDRATE (¹related to: Copper compounds, n.o.s.) (²related to: Cupric sulfate)	7758-99-8	Yes¹	Yes²	No	Yes¹	Yes¹
ACETIC ACID	64-19-7	Yes	Yes	Yes	Yes	Yes

California Proposition 65

Not regulated under California Proposition 65

Canadian Regulations

This product has been classified in accordance with the criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

Canada WHMIS

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

CUPRIC SULFATE PENTAHYDRATE (7758-99-8)

1 % (related to Copper compounds, n.o.s.)

ACETIC ACID (64-19-7)

1 %

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WHMIS Classification

Not a Controlled Product under Canada's Workplace Hazardous Material Information System.

European Regulations

This preparation has been classified for the European Union according to Annex VI Directives 67/548/EEC and 99/45/EC.

Germany Water Classification

CUPRIC SULFATE PENTAHYDRATE (7758-99-8)

ID Number 141, hazard class 2 - hazard to waters (related to Cupric sulfate)

ID Number 141, hazard class 2 - hazard to waters (related to Cupric sulfate)

ACETIC ACID (64-19-7)

ID Number 93, hazard class 1 - low hazard to waters (>25%)

EU Marking and Labelling

Symbols

N Dangerous for the environment

Risk Phrases

R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases

S57 Use appropriate container to avoid environmental contamination.

S60 This material and its container must be disposed of as hazardous waste.

Japanese Regulations

Japan Designated Chemical Substances (PRTR Law)

The following components are subject to reporting requirements as specified by the "Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management" and are included in the "Pollutant Release and Transfer Register (PRTR)" of designated chemicals.

CUPRIC SULFATE PENTAHYDRATE (7758-99-8)

272 \geq 1 % [as Cu, 0.255] (water-soluble, except complex salts)

Japan Poisonous and Deleterious Substances

The following components are specified as poisonous and deleterious substances, and are regulated by Japan under the Poisonous and Deleterious Substances Control Law.

CUPRIC SULFATE PENTAHYDRATE (7758-99-8)

Deleterious, 100%

Industrial Safety and Health Law - Flammable Materials

The following components are identified in Table 6-2 of the Enforcement Order of the Industrial Safety and Health Law which, if used in the workplace, require designation of an Operations Chief during confined space work and periodic machine inspections.

ACETIC ACID (64-19-7)

Flammable substance

Industrial Safety and Health Law - Label Disclosure

No components of this material are specifically required to be indicated on a container label as specified by Article 18 of the Enforcement Order of the Industrial Safety and Health Law.

Industrial Safety and Health Law - Organic Solvents

No components of this material are specifically identified in Table 6-2 of the Enforcement Order of the Industrial Safety and Health Law which, if used in the workplace, require designation of an Operations Chief during confined space work and periodic machine inspections.

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* * * Section 16 - Other Information * * *

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

Full text of R phrases in Section 3

R10 Flammable.

R22 Harmful if swallowed.

R35 Causes severe burns.

R36/38 Irritating to eyes and skin.

R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Other Information

Limitations: The information and recommendations set forth in this MSDS are believed to be correct as of this date. Ventana Medical Systems, Inc. makes no warranty with respect to the content of this MSDS and disclaims all liability from reliance thereon.

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New MSDS: 2/17/2012

End of Sheet VEN-178