



a member of the Roche Group

Material Safety Data Sheet

Material Name: mRNA DAB

MSDS ID: VEN-179

***** 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 DAB

Product Number(s)

06581200001, 253-4702, 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

R:61

Risks

May cause harm to the unborn child.

EMERGENCY OVERVIEW

Color: colorless

Physical Form: liquid

Odor: odorless

Major Health Hazards: cancer

POTENTIAL HEALTH EFFECTS

Inhalation

Short Term: irritation

Long Term: irritation, cancer

Skin

Short Term: irritation

Long Term: irritation, cancer

Eye

Short Term: irritation

Long Term: irritation

Ingestion

Short Term: irritation

Long Term: irritation, cancer

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OSHA Regulatory Status

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

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

CAS #	Component / EU Number	Percent	Symbol(s)	Risk Phrase(s)
Not Available	NON-HAZARDOUS	60-100	---	---
9002-92-0	BRIJ 35 500-002-6	<1	---	---
142-08-5	2(1H)-Pyridinone 205-520-3	<1	T	R:25
288-32-4	IMIDAZOLE 206-019-2	<1	Xn C	R:22-34
7411-49-6	3,3'-DIAMINOBENZIDINE TETRAHYDROCHLORIDE 231-018-9	<0.1	T N	R:45-22-50/53

Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Salts of benzidine, Benzidine compounds, 3,3'-Diaminobenzidine salts.

*** 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

Do not use high-pressure water streams.

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

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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.

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

Handling Procedures

Wash thoroughly after handling.

Storage Procedures

Store and handle in accordance with all current regulations and standards. See original container for storage recommendations. Keep separated from incompatible substances.

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

Exposure Limits

3,3'-DIAMINOBENZIDINE TETRAHYDROCHLORIDE (7411-49-6)

Austria: skin notation (related to Salts of benzidine)

Germany (DFG): skin notation (related to Salts of benzidine)

Greece: 0.1 % (per weight concentration limit for exemption, related to Salts of benzidine)

Ireland: 0.1% per weight concentration limit for exemption (related to Salts of benzidine)

Ventilation

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.

Protective Materials

latex, vinyl

Respiratory Protection

No respirator is required under normal conditions of use.

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

Physical State: Liquid	Appearance: colorless, liquid
Color: colorless	Physical Form: liquid
Odor: odorless	Odor Threshold: Not available
pH: 2.3	Melting/Freezing Point: Not available
Boiling Point: Not available	Decomposition: Not available
Flash Point: No data available	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: Not available	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

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:

IMIDAZOLE (288-32-4)

Oral LD50 Rat 220 mg/kg

BRIJ 35 (9002-92-0)

Oral LD50 Rat 1 g/kg

2(1H)-Pyridinone (142-08-5)

Oral LD50 Rat 124 mg/kg

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RTECS Acute Toxicity (selected)

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

IMIDAZOLE (288-32-4)

Oral: 220 mg/kg Oral Rat LD50

BRIJ 35 (9002-92-0)

Oral: 1 gm/kg Oral Rat LD50; 8600 mg/kg Oral Rat LD50; 8600 mg/kg Oral Rat LD50; 4150 mg/kg Oral Rat LD50

2(1H)-Pyridinone (142-08-5)

Oral: 124 mg/kg Oral Rat LD50

Acute Toxicity Level

IMIDAZOLE (288-32-4)

Toxic: ingestion

BRIJ 35 (9002-92-0)

Moderately Toxic: ingestion

Slightly Toxic: ingestion

2(1H)-Pyridinone (142-08-5)

Toxic: ingestion

Irritation/Corrosivity

RTECS Irritation

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

BRIJ 35 (9002-92-0)

6 mg/3 day(s) intermittent Skin Human moderate; 10 mg Eyes Rabbit; 100 mg Eyes Rabbit; 750 ug/24 hour Eyes Rabbit severe; 100 mg Skin Rabbit; 75 mg/24 hour Skin Rabbit mild; 500 mg/24 hour Skin Rabbit mild; 500 mg/24 hour Skin Rabbit moderate; 1 percent Skin Woman

Local Effects

IMIDAZOLE (288-32-4)

Corrosive: inhalation, skin, eye, ingestion

BRIJ 35 (9002-92-0)

Irritant: eye

Carcinogenicity

Component Carcinogenicity

3,3'-DIAMINOBENZIDINE TETRAHYDROCHLORIDE (7411-49-6)

Austria: Group A1 Carcinogen (use prohibited if >0.1 w% in a preparation, related to Salts of benzidine)

Denmark: Present (related to Salts of benzidine)

Germany: Category 3B (could be carcinogenic for man)

Italy: Category 1 Carcinogen (related to Salts of benzidine)

Netherlands: Present (related to Salts of benzidine)

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.

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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.

Additional Data

IARC has concluded that Benzidine and its salts are carcinogenic.

*** Section 12 - Ecological Information***

Component Analysis - Aquatic Toxicity

IMIDAZOLE (288-32-4)

Fish: 48 Hr LC50 Leuciscus idus: 280 mg/L [static]

Algae: 72 Hr EC50 Desmodesmus subspicatus: 130 mg/L; 96 Hr EC50 Desmodesmus subspicatus: 82 mg/L

Invertebrate: 48 Hr EC50 Daphnia magna: 341.5 mg/L

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.

*** 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

None of this products components are listed under SARA Sections 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), or CERCLA (40 CFR 302.4), TSCA 12(b), or require an OSHA process safety plan.

SARA 311/312

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

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U.S. State Regulations

None of this product's components are listed on the state lists from CA, MA, MN, NJ or PA.

California Proposition 65

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.

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:

BRIJ 35 (9002-92-0)

1 %

WHMIS Classification

D2A.

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

IMIDAZOLE (288-32-4)

ID Number 1448, hazard class 1 - low hazard to waters

BRIJ 35 (9002-92-0)

ID Number 670, hazard class 2 - hazard to waters

EU Marking and Labelling

Symbols

T Toxic

Risk Phrases

R61 May cause harm to the unborn child.

Safety Phrases

S53 Avoid exposure - obtain special instructions before use.

S35 This material and its container must be disposed of in a safe way.

S36/37 Wear suitable protective clothing and gloves.

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.

BRIJ 35 (9002-92-0)

407 >=1 %

Japan Poisonous and Deleterious Substances

No components of this material are specified as poisonous or deleterious substances, as regulated by Japan under the Poisonous and Deleterious Substances Control Law.

Industrial Safety and Health Law - Flammable Materials

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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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.

* * * 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

R22 Harmful if swallowed.

R25 Toxic if swallowed.

R34 Causes burns.

R45 May cause cancer.

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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End of Sheet VEN-179