

Safety Data Sheet acc. to OSHA HCS

Date of issue: 05/08/2026

Revision date 05/08/2026

1 Identification

- **Product identifier**
- **Trade name: BmrA (B. subtilis 168)**
- **Synonym** Multidrug Resistance ABC Transporter ATP-binding/permeaseProtein BmrA
- **Other means of identification**
- **Article number:** 24734
- **Application of the substance / the mixture**
This product is for research use - Not for human or veterinary diagnostic or therapeutic use.
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
Cayman Chemical Co.
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108
USA
- **Information department:** Product safety department
- **Emergency telephone number:**
During normal opening times: +1 (734) 971-3335
US/CANADA: 800-424-9300
Outside US/CANADA: 703-741-5970

2 Hazard(s) identification

- **Classification of the substance or mixture**
The product is not classified, according to the Globally Harmonized System (GHS).
- **Label elements**
- **GHS label elements** None
- **Hazard pictograms** None
- **Signal word** None
- **Hazard statements** None
- **Information pertaining to particular dangers for man and environment:**
- **Classification system:**
- **NFPA ratings (scale 0 - 4)**



Health = 0
Fire = 0
Reactivity = 0

- **HMIS-ratings (scale 0 - 4)**



HEALTH 0 Health = 0
FIRE 0 Fire = 0
REACTIVITY 0 Reactivity = 0

(Contd. on page 2)

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 05/08/2026

Revision date 05/08/2026

Trade name: BmrA (B. subtilis 168)

(Contd. from page 1)

- **Other hazards**
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Classification according to (d)(1)(ii) of § 1910.1200**
The SDS issuer does not object to the classifications provided by importers or manufacturers of precursor products.
- **Hazards not otherwise classified**
There are no adverse physical or health effects known that are not covered by the hazard classes of the Hazard Communications Standard.

3 Composition/information on ingredients

- **Chemical characterization: Mixtures**
- **Description:** Mixture of the substances listed below with nonhazardous additions.

- **Dangerous components:**

CAS: 56-81-5 RTECS: MA8050000	Glycerol	10.0%
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- **Other ingredients**

CAS: 7732-18-5 RTECS: ZC0110000	Water	88.52%
CAS: 1185-53-1	Tris HCl	0.79%
CAS: 7647-14-5 RTECS: VZ4725000	Sodium chloride	0.58%
	BmrA (B. subtilis 168)	0.1%
CAS: 69227-93-6	n-Dodecyl-β-D-maltoside	0.01%

4 First-aid measures

- **Description of first aid measures**
- **General information:** No special measures required.
- **After inhalation:** Supply fresh air; consult doctor in case of complaints.
- **After skin contact:** Generally the product does not irritate the skin.
- **After eye contact:** Rinse opened eye for several minutes under running water.
- **After swallowing:** If symptoms persist consult doctor.
- **Most important symptoms and effects, both acute and delayed**
No further relevant information available.
- **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:**
Use fire fighting measures that suit the environment.
A solid water stream may be inefficient.
- **Special hazards arising from the substance or mixture** No further relevant information available.

(Contd. on page 3)

US

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 05/08/2026

Revision date 05/08/2026

Trade name: BmrA (B. subtilis 168)

(Contd. from page 2)

- **Advice for firefighters**
- **Protective equipment:** No special measures required.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures** Not required.
- **Environmental precautions:**
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
- **Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
- **Protective Action Criteria for Chemicals**

- **PAC-1:**

56-81-5	Glycerol	45 mg/m ³
1185-53-1	Tris HCl	12 mg/m ³

- **PAC-2:**

56-81-5	Glycerol	180 mg/m ³
1185-53-1	Tris HCl	130 mg/m ³

- **PAC-3:**

56-81-5	Glycerol	1,100 mg/m ³
1185-53-1	Tris HCl	790 mg/m ³

- **Reference to other sections**

See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

- **Precautions for safe handling** No special measures required.
- **Information about protection against explosions and fires:** No special measures required.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:** Store in accordance with information listed on the product insert.
- **Requirements to be met by storerooms and receptacles:** No special requirements.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:** None.
- **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

- **Control parameters**

- **Components with limit values that require monitoring at the workplace:**

56-81-5 Glycerol

PEL	Long-term value: 15* 5** mg/m ³ mist; *total dust **respirable fraction
TLV	TLV withdrawn-insufficient data human occup. exp.

- **Additional information:** The lists that were valid during the creation were used as basis.

(Contd. on page 4)

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 05/08/2026

Revision date 05/08/2026

Trade name: BmrA (B. subtilis 168)

(Contd. from page 3)

- **Exposure controls**
- **Appropriate engineering controls** No further data; see section 7.
- **Personal protective equipment:**
- **General protective and hygienic measures:**
The usual precautionary measures for handling chemicals should be followed.
- **Breathing equipment:** Not required.
- **Protection of hands:**
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
- **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
- **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
- **Eye protection:** Goggles recommended during refilling.

9 Physical and chemical properties

- **Information on basic physical and chemical properties**
- **General Information**
- **Physical state** Liquid
- **Color:** Not determined.
- **Odor:** Characteristic
- **Molecular Weight** 64.5 kDa
- **Storage Buffer**
- **Odor threshold:** Not determined.
- **Formulation** 50 mM Tris-Cl, pH 8.0, 100 mM NaCl, 0.01% DDM, and 10%glycerol
- **Melting point/Melting range:** Undetermined.
- **Boiling point/Boiling range:** Undetermined.
- **Flammability:** Not applicable.
- **Explosion limits:**
- **Lower:** Not determined.
- **Upper:** Not determined.
- **Flash point:** Not applicable.
- **Decomposition temperature:** Not determined.
- **pH-value at 20 °C (68 °F):** 8
- **Viscosity:**
- **Kinematic:** Not determined.
- **SOLUBILITY**
- **Dynamic:** Not determined.
- **Solubility in / Miscibility with**
- **Water:** Fully miscible.
- **Partition coefficient (n-octanol/water):** Not determined.
- **Vapor pressure:** Not determined.

(Contd. on page 5)

US

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 05/08/2026

Revision date 05/08/2026

Trade name: BmrA (B. subtilis 168)

(Contd. from page 4)

- **Vapor pressure:**
 - **Density:** Not determined.
 - **Relative density** Not determined.
 - **Vapor density** Not determined.
 - **Particle characteristics** Not applicable.
- **Other information**
 - **Appearance:**
 - **Form:** Liquid
 - **Important information on protection of health and environment, and on safety.**
 - **Ignition temperature:** Product is not selfigniting.
 - **Danger of explosion:** Product does not present an explosion hazard.
 - **Solvent content:**
 - **Organic solvents:** 10.0 %
 - **Water:** 88.5 %
 - **VOC content:** 0.00 %
 - 0.0 g/l / 0.00 lb/gal
 - **Solids content:** 99.0 %
 - **Change in condition**
 - **Evaporation rate** Not determined.

10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:**
No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

- **Information on toxicological effects**

- **Acute toxicity:**

- **LD/LC50 values that are relevant for classification:**

56-81-5 Glycerol

Oral	LD50	12,600 mg/kg (rat)
Irritation of skin	Irritation	500 mg/24h (rabbit) mild
Irritation of eyes	Irritation	500 mg/24h (rabbit) mild
	Intraperitoneal LD50	4,420 mg/kg (rat)
	Subcutaneous LD50	100 mg/kg (rat)

- **Primary irritant effect:**
- **on the skin:** No irritant effect.
- **on the eye:** No irritating effect.

(Contd. on page 6)

US

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 05/08/2026

Revision date 05/08/2026

Trade name: BmrA (B. subtilis 168)

(Contd. from page 5)

- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**
The product is not subject to classification according to internally approved calculation methods for preparations:
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.
- **Interactive effects** No interactive effects between components are known.
- **Carcinogenic categories**

· IARC (International Agency for Research on Cancer)
None of the ingredients is listed.

· NTP (National Toxicology Program)
None of the ingredients is listed.

· OSHA-Ca (Occupational Safety & Health Administration)
None of the ingredients is listed.
- **Alternative sources for toxicological information**
No non-standard sources for toxicological information where used.

12 Ecological information

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.
- **Bioaccumulative potential** No further relevant information available.
- **Mobility in soil** No further relevant information available.
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects**
- **Additional ecological information:**
- **General notes:**
Water hazard class 1 (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:** Smaller quantities can be disposed of with household waste.
- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.
- **Recommended cleansing agent:** Water, if necessary with cleansing agents.

14 Transport information

- **UN-Number**
- **DOT, IMDG, IATA** not regulated

(Contd. on page 7)

-US

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 05/08/2026

Revision date 05/08/2026

Trade name: BmrA (B. subtilis 168)

(Contd. from page 6)

- | | |
|--|-----------------|
| · UN proper shipping name
· DOT, IMDG, IATA | not regulated |
| · Transport hazard class(es)
· DOT, ADN, IMDG, IATA
· Class | not regulated |
| · Packing group
· DOT, IMDG, IATA | not regulated |
| · Environmental hazards: | Not applicable. |
| · Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code | Not applicable. |
| · Special precautions for user | Not applicable. |
| · UN "Model Regulation": | not regulated |

15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
No further relevant information available.

- **Sara**

- **Section 355 (extremely hazardous substances):**

None of the ingredients is listed.

- **Section 313 (Specific toxic chemical listings):**

None of the ingredients is listed.

- **TSCA (Toxic Substances Control Act):**

7732-18-5	Water	ACTIVE
56-81-5	Glycerol	ACTIVE
1185-53-1	Tris HCl	ACTIVE
7647-14-5	Sodium chloride	ACTIVE

- **Hazardous Air Pollutants**

None of the ingredients is listed.

- **Chemicals known to cause cancer:**

None of the ingredients is listed.

- **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients is listed.

- **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients is listed.

- **Chemicals known to cause developmental toxicity:**

None of the ingredients is listed.

- **Carcinogenic categories**

- **EPA (Environmental Protection Agency)**

None of the ingredients is listed.

(Contd. on page 8)

us

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 05/08/2026

Revision date 05/08/2026

Trade name: BmrA (B. subtilis 168)

(Contd. from page 7)

· **TLV (Threshold Limit Value)**

None of the ingredients is listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**

None of the ingredients is listed.

· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

All chemicals may pose unknown hazards and should be used with caution. This SDS applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this SDS. Cayman Chemical Company assumes no responsibility for incidental or consequential damages, including lost profits, arising from the use of these data. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this SDS is based on technical data judged to be reliable, Cayman Chemical Company assumes no responsibility for the completeness or accuracy of the information contained herein.

· **Department issuing SDS:** Environment protection department.

· **Contact:** -

· **Date of previous version** 03/08/2024

· **Date of preparation** 05/08/2026

· **Abbreviations and acronyms:**

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

VOC: Volatile Organic Compounds (USA, EU)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

NIOSH: National Institute for Occupational Safety

OSHA: Occupational Safety & Health

TLV: Threshold Limit Value

PEL: Permissible Exposure Limit

REL: Recommended Exposure Limit

· *** Data compared to the previous version altered.**

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