

## Material Safety Data Sheet

United States  
English

## Section 1. Chemical product and company identification

**Product name** Biotin hydrazide, 5.0 mM; part of 'ECL™  
Glycoprotein Detection module, 25 membrane  
reactions'

**Catalogue Number** RPN2190



**Component Number** 1058741

**Material uses** Industrial applications: Analytical chemistry. Research.

**Product type** Liquid.

**Validation date** 14 June 2011

**Print date** 14 June 2011

**Supplier** GE Healthcare UK Ltd  
Amersham Place  
Little Chalfont  
Buckinghamshire HP7 9NA  
England  
+44 0870 606 1921

<b>In case of emergency</b>	US	ChemTrec (US)	1-800-424-9300
	Canada	ChemTrec (US)	1-703-527-3887

## 2. Hazards identification

**Physical state** Liquid.

**Odor** Ammoniacal. / Fish. [Slight]

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

**Emergency overview** WARNING!

FLAMMABLE LIQUID AND VAPOR. COMBUSTIBLE. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. BIRTH DEFECT HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE BIRTH DEFECTS.

**Precautionary measures** Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Do not eat, drink or smoke when using this product. Avoid contact with eyes, skin and clothing. Keep away from heat, sparks and flame. Keep container tightly closed. Use personal protective equipment as required. Wash thoroughly after handling.

**Routes of entry** Dermal contact. Eye contact. Inhalation. Ingestion.

**Potential acute health effects**

**Eyes** Irritating to eyes.

**Skin** Irritating to skin.

**Inhalation** Severely irritating to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

**Ingestion** Harmful if swallowed.

**Potential chronic health effects**

**Chronic effects** Contains material that can cause target organ damage.

**Carcinogenicity** No known significant effects or critical hazards.

**Mutagenicity** No known significant effects or critical hazards.

**Teratogenicity** Contains material which can cause birth defects.

**Developmental effects** No known significant effects or critical hazards.

**Fertility effects** No known significant effects or critical hazards.



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<b>Target organs</b>	Contains material which may cause damage to the following organs: kidneys, liver, digestive system, cardiovascular system, upper respiratory tract, skin, eyes.
<b>Inhalation</b>	Adverse symptoms may include the following: respiratory tract irritation coughing reduced fetal weight increase in fetal deaths skeletal malformations
<b>Ingestion</b>	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations
<b>Skin</b>	Adverse symptoms may include the following: irritation redness reduced fetal weight increase in fetal deaths skeletal malformations
<b>Eyes</b>	Adverse symptoms may include the following: pain or irritation watering redness reduced fetal weight increase in fetal deaths skeletal malformations
<b>Medical conditions aggravated by over-exposure</b>	Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

### 3. Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>% by weight</u>
N,N-DIMETHYLFORMAMIDE	68-12-2	99 - 100

### Section 4. First aid measures


<b>Eye contact</b>	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
<b>Skin contact</b>	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
<b>Inhalation</b>	Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
<b>Ingestion</b>	Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
<b>Protection of first-aiders</b>	No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

### Section 5. Fire-fighting measures



<b>Flammability of the product</b>	Flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.
<b><u>Extinguishing media</u></b>	
<b>Suitable</b>	Use dry chemical, CO <sub>2</sub> , water spray (fog) or foam.
<b>Not suitable</b>	Do not use water jet.
<b>Special exposure hazards</b>	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
<b>Hazardous combustion products</b>	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides
<b>Special protective equipment for fire-fighters</b>	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.



## Section 6. Accidental release measures


<b>Personal precautions</b>	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
<b>Environmental precautions</b>	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
<b>Methods for cleaning up</b>	Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.
<b>Small spill</b>	 Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

## Section 7. Handling and storage

<b>Handling</b>	 Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Avoid exposure during pregnancy. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.
<b>Storage</b>	 Store between the following temperatures: 2 to 8°C (35.6 to 46.4°F). Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

## Section 8. Exposure controls/personal protection

### Product name

 N,N-DIMETHYLFORMAMIDE

### Exposure limits

ACGIH TLV (United States, 2/2010). Absorbed through skin. Notes: 1996 Adoption Substances for which there is a Biological Exposure Index or Indices Refers to

#### Appendix A -- Carcinogens.

TWA: 30 mg/m<sup>3</sup> 8 hour(s).

TWA: 10 ppm 8 hour(s).

#### NIOSH REL (United States, 6/2009). Absorbed through skin.

TWA: 30 mg/m<sup>3</sup> 10 hour(s).

TWA: 10 ppm 10 hour(s).

#### OSHA PEL (United States, 11/2006). Absorbed through skin.

TWA: 30 mg/m<sup>3</sup> 8 hour(s).

TWA: 10 ppm 8 hour(s).

#### OSHA PEL 1989 (United States, 3/1989). Absorbed through skin.

TWA: 30 mg/m<sup>3</sup> 8 hour(s).

TWA: 10 ppm 8 hour(s).

### Recommended monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

### Engineering measures

Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

### Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

### Personal protection



<b>Respiratory</b>	Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
<b>Hands</b>	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
<b>Eyes</b>	Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
<b>Skin</b>	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.
<b>Environmental exposure controls</b>	Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

## Section 9. Physical and chemical properties

<b>Physical state</b>	Liquid.
<b>Flash point</b>	Closed cup: 58°C (136.4°F) Open cup: 57°C (134.6°F)
<b>Auto-ignition temperature</b>	445°C (833°F)
<b>Flammable limits</b>	Lower: 2.2% Upper: 16%
<b>Color</b>	Colorless to light yellow.
<b>Odor</b>	Ammoniacal. / Fish. [Slight]
<b>Boiling/condensation point</b>	Decomposes.
<b>Melting/freezing point</b>	Decomposes.
<b>Volatility</b>	100% (w/w)
<b>Odor threshold</b>	100 ppm
<b>VOC</b>	100.1 % (w/w)
<b>Solubility</b>	Easily soluble in the following materials: cold water, hot water and diethyl ether.

## Section 10. Stability and reactivity

<b>Stability</b>	The product is stable.
<b>Conditions to avoid</b>	Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
<b>Materials to avoid</b>	Reactive or incompatible with the following materials: oxidizing materials
<b>Possibility of hazardous reactions</b>	Under normal conditions of storage and use, hazardous reactions will not occur.  Non-explosive in the presence of the following materials or conditions: open flames, sparks and static discharge, heat, shocks and mechanical impacts, oxidizing materials, reducing materials, combustible materials, organic materials, metals, acids, alkalis and moisture.

## Section 11. Toxicological information

### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
N,N-DIMETHYLFORMAMIDE	LC50 Inhalation Gas.	Rat	3421 ppm	1 hours
	LC50 Inhalation Gas.	Rat	1948 ppm	4 hours
	LD50 Dermal	Rabbit	4720 mg/kg	-
	LD50 Dermal	Rat	>3.2 g/kg	-
	LD50 Oral	Rat	2000 mg/kg	-

**Conclusion/Summary** Not available.

### Sensitizer

**Conclusion/Summary** Not available.

### Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
N,N-DIMETHYLFORMAMIDE	A4	3	-	-	-	-

## Section 12. Ecological information

**Environmental effects** No known significant effects or critical hazards.

### Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
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N,N-DIMETHYLFORMAMIDE	-	Acute EC50 4500000 to 5200000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - <=6 hours	48 hours
	-	Acute EC50 7100000 to 7500000 ug/L Fresh water	Fish - Bluegill - Lepomis macrochirus - 0.912 g	96 hours
	-	Acute LC50 >100000 ug/L Marine water	Crustaceans - Common shrimp, sand shrimp - Crangon crangon - Adult	48 hours
	-	Chronic NOEC 6 g/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
<b>Conclusion/Summary</b>		Not available.		
<b>Biodegradability</b>				
<b>Conclusion/Summary</b>		Not available.		
<b>Other adverse effects</b>		No known significant effects or critical hazards.		

## Section 13. Disposal considerations

**Waste disposal** The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

## Section 14. Transport information

### International transport regulations

Not classified.

## Section 15. Regulatory information

<b>HCS Classification</b>	Combustible liquid Irritating material Target organ effects
<b>U.S. Federal regulations</b>	<p><b>TSCA 8(a) IUR Exempt/Partial exemption:</b> Not determined</p> <p><b>United States inventory (TSCA 8b):</b> Not determined.</p> <p><b>SARA 302/304/311/312 extremely hazardous substances:</b> No products were found.</p> <p><b>SARA 302/304 emergency planning and notification:</b> No products were found.</p> <p><b>SARA 302/304/311/312 hazardous chemicals:</b> N,N-DIMETHYLFORMAMIDE</p> <p><b>SARA 311/312 MSDS distribution - chemical inventory - hazard identification:</b> N,N-DIMETHYLFORMAMIDE: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard</p>

**Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)** ☒ Listed

**Clean Air Act Section 602 Class I Substances** ☒ Not listed

**Clean Air Act Section 602 Class II Substances** ☒ Not listed



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DEA List I Chemicals (Precursor Chemicals) ☒ Not listed

DEA List II Chemicals (Essential Chemicals) ☒ Not listed

### SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
Form R - Reporting requirements	<input checked="" type="checkbox"/> N,N-DIMETHYLFORMAMIDE	68-12-2	99 - 100
Supplier notification	<input checked="" type="checkbox"/> N,N-DIMETHYLFORMAMIDE	68-12-2	99 - 100

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

### State regulations

Massachusetts	<input checked="" type="checkbox"/> The following components are listed: DIMETHYLFORMAMIDE
New York	<input checked="" type="checkbox"/> The following components are listed: Dimethyl formamide
New Jersey	<input checked="" type="checkbox"/> The following components are listed: DIMETHYLFORMAMIDE; FORMAMIDE, N,N-DIMETHYL-
Pennsylvania	<input checked="" type="checkbox"/> The following components are listed: FORMAMIDE, N,N-DIMETHYL-

### California Prop. 65

United States inventory (TSCA 8b) Not determined.

### International regulations

International lists	<input checked="" type="checkbox"/> <b>Australia inventory (AICS):</b> Not determined. <b>China inventory (IECSC):</b> Not determined. <b>Japan inventory:</b> Not determined. <b>Korea inventory:</b> Not determined. <b>New Zealand Inventory of Chemicals (NZIoC):</b> Not determined. <b>Philippines inventory (PICCS):</b> Not determined.
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Chemical Weapons Convention List Schedule I Chemicals ☒ Not listed

Chemical Weapons Convention List Schedule II Chemicals ☒ Not listed

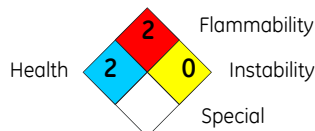
Chemical Weapons Convention List Schedule III Chemicals ☒ Not listed

## Section 16. Other information

**Label requirements** FLAMMABLE LIQUID AND VAPOR. COMBUSTIBLE. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. BIRTH DEFECT HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE BIRTH DEFECTS.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



Indicates information that has changed from previously issued version.

### History

Date of printing	14 June 2011	Date of previous issue	13 March 2009
Date of issue	14 June 2011	Version	5

### Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



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