

# Material Safety Data Sheet

NBT

## 1. Product and company identification

<b>Product name</b>	: NBT	
<b>Synonym</b>	: 2H-Tetrazolium, 2,2'-(3,3'-dimethoxy[1,1'-biphenyl]-4,4'-diyl)bis[3-(4-nitrophenyl)-5-phenyl-, chloride (1:2); 2H-Tetrazolium, 3,3'-(3,3'-dimethoxy[1,1'-biphenyl]-4,4'-diyl)bis[2-(4-nitrophenyl)-5-phenyl-, dichloride; Nitro blue tetrazolium; Nitrotetrazolium chloride blue; 2H-Tetrazolium, 2,2'-(3,3'-dimethoxy[1,1'-biphenyl]-4,4'-diyl)bis[3-(4-nitrophenyl)-5-phenyl-, dichloride; 2H-Tetrazolium, 3,3'-(3,3'-dimethoxy[1,1'-biphenyl]-4,4'-diyl)bis(2-(4-nitrophenyl)-5-phenyl-,dichloride	
<b>Chemical formula</b>	: C40-H30-N10-O6.2Cl	
<b>Supplier</b>	<b>Manufacturer</b>	: Thermo Fisher Scientific Pierce Biotechnology P.O. Box 117 Rockford, IL 61105 United States 815.968.0747 or 800.874.3723 7 AM - 5 PM Central Time (GMT -06:00)
<b>Code</b>	: 0034035 1896851	
<b>MSDS #</b>	: 0975	
<b>Validation date</b>	: 3/13/2013.	
<b>Print date</b>	: 3/13/2013.	
<b>Responsible name</b>	: MSDS (Regulatory Specialist)	
<b>In case of emergency</b>	<b>Material uses</b>	: <b>Refer to the instruction booklet for proper and intended use. Otherwise, contact supplier for specific applications.</b>
<b>Product type</b>	: Powder.	

## 2. Hazards identification

### Emergency overview

<b>Physical state</b>	: Solid. [Crystalline powder.]
<b>Color</b>	: Yellow. [Light]
<b>Odor</b>	: Odorless.
<b>Signal word</b>	: WARNING!
<b>Hazard statements</b>	: CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED. CAN CAUSE TARGET ORGAN DAMAGE.

3/13/2013.

1/10

NBT

## 2. Hazards identification

<b>Precautionary measures</b>	: Do not breathe dust. 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. Avoid prolonged contact with eyes, skin and clothing. Keep container tightly closed. Wash thoroughly after handling.
<b>OSHA/HCS status</b>	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
<b>Routes of entry</b>	: Eye contact. Inhalation. Ingestion.
<b>Potential acute health effects</b>	
<b>Inhalation</b>	: Irritating to respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
<b>Ingestion</b>	: Harmful if swallowed.
<b>Skin</b>	: Harmful in contact with skin. Irritating to skin.
<b>Eyes</b>	: Irritating to eyes.
<b>Potential chronic health effects</b>	
<b>Chronic effects</b>	: Can cause target organ damage. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.
<b>Carcinogenicity</b>	: No known significant effects or critical hazards.
<b>Mutagenicity</b>	: No known significant effects or critical hazards.
<b>Teratogenicity</b>	: No known significant effects or critical hazards.
<b>Developmental effects</b>	: No known significant effects or critical hazards.
<b>Fertility effects</b>	: No known significant effects or critical hazards.
<b>Target organs</b>	: Causes damage to the following organs: kidneys, liver, mucous membranes, heart, upper respiratory tract, skin, eyes.
<b>Over-exposure signs/symptoms</b>	
<b>Inhalation</b>	: Adverse symptoms may include the following: respiratory tract irritation coughing
<b>Ingestion</b>	: No specific data.
<b>Skin</b>	: Adverse symptoms may include the following: irritation redness
<b>Eyes</b>	: Adverse symptoms may include the following: pain or irritation watering redness
<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

### United States

Name	CAS number	%
5,5'-diphenyl-3,3'-bis(4-nitrophenyl)-2,2'-(3,3'-dimethoxybiphenyl-4,4'-ylene) ditetrazolium dichloride	298-83-9	98 - 100

### Canada

3/13/2013.

2/10

NBT

### 3. Composition/information on ingredients

Name	CAS number	%
5,5'-diphenyl-3,3'-bis(4-nitrophenyl)-2,2'-(3,3'-dimethoxybiphenyl-4,4'-ylene) ditetrazolium dichloride	298-83-9	98 - 100

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

### 4. First aid measures

- Eye contact** : 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.
- Skin contact** : 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.
- Inhalation** : 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.
- Ingestion** : 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.
- Protection of first-aiders** : 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.
- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

### 5. Fire-fighting measures

- Flammability of the product** : Fine dust clouds may form explosive mixtures with air.
- Extinguishing media**
- Suitable** : Use dry chemical powder.
- Not suitable** : Do not use water jet.
- Special exposure hazards** : 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.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:  
carbon dioxide  
carbon monoxide  
nitrogen oxides  
halogenated compounds
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special remarks on explosion hazards** : Fine dust dispersed in air in sufficient concentrations, and in the presences of an ignition source is a potential dust explosion hazard.

3/13/2013.

3/10

NBT

### 6. Accidental release measures

- Personal precautions** : 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 dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : 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).
- Methods for cleaning up**
- Small spill** : Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.
- Large spill** : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

### 7. Handling and storage

- Handling** : 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. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing dust. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : 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.

### 8. Exposure controls/personal protection

Canada

**Occupational exposure limits**

No exposure limit value known.

**Consult local authorities for acceptable exposure limits.**

3/13/2013.

4/10

NBT

## 8. Exposure controls/personal protection

- 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. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.
- Engineering measures** : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, 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**
- Respiratory** : Use a properly fitted, particulate filter 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.
- Hands** : 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. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Eyes** : 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. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles. If operating conditions cause high dust concentrations to be produced, use dust goggles.
- Skin** : 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.
- Environmental exposure controls** : 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.

## 9. Physical and chemical properties

- Physical state** : Solid. [Crystalline powder.]
- Flash point** : [Product does not sustain combustion.]
- Color** : Yellow. [Light]
- Odor** : Odorless.
- Molecular weight** : 817.7 g/mole
- Molecular formula** : C40-H30-N10-O6.2Cl
- Boiling/condensation point** : Decomposition temperature: 200°C (392°F)
- Melting/freezing point** : 189°C (372.2°F)
- Vapor density** : 28.1 [Air = 1]

3/13/2013.

5/10

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## 9. Physical and chemical properties

- Volatility** : 0% (v/v)
- Solubility** : Partially soluble in the following materials: cold water, hot water and methanol.

## 10. Stability and reactivity

- Chemical stability** : The product is stable.
- Conditions to avoid** : Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). 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. Prevent dust accumulation.
- Incompatible materials** : Reactive or incompatible with the following materials: oxidizing materials
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.

## 11. Toxicological information

### United States

#### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
5,5'-diphenyl-3,3'-bis (4-nitrophenyl)-2,2'-(3,3'-dimethoxybiphenyl-4,4'-ylene) ditetrazolium dichloride	LD50 Oral	Mouse	2 g/kg	-

- Conclusion/Summary** : Not available.
- Chronic toxicity**
- Conclusion/Summary** : May cause convulsions.
- Irritation/Corrosion**
- Conclusion/Summary** : Not available.
- Sensitizer**
- Conclusion/Summary** : Not available.
- Carcinogenicity**
- Conclusion/Summary** : Not available.
- Classification**

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
5,5'-diphenyl-3,3'-bis (4-nitrophenyl)-2,2'-(3,3'-dimethoxybiphenyl-4,4'-ylene) ditetrazolium dichloride	-	-	-	None.	-	None.

#### Mutagenicity

- Conclusion/Summary** : Investigated as a mutagen.
- Teratogenicity**
- Conclusion/Summary** : Not available.
- Reproductive toxicity**
- Conclusion/Summary** : Not available.

3/13/2013.

6/10

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## 11. Toxicological information

Canada

### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
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**Conclusion/Summary** : Not available.

### Chronic toxicity

**Conclusion/Summary** : May cause convulsions.

### Irritation/Corrosion

**Conclusion/Summary** : Not available.

### Sensitizer

**Conclusion/Summary** : Not available.

### Carcinogenicity

**Conclusion/Summary** : Not available.

### Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
5,5'-diphenyl-3,3'-bis(4-nitrophenyl)-2,2'-(3,3'-dimethoxybiphenyl-4,4'-ylene)ditetrazolium dichloride	-	-	-	None.	-	None.

### Mutagenicity

**Conclusion/Summary** : Investigated as a mutagen.

### Teratogenicity

**Conclusion/Summary** : Not available.

### Reproductive toxicity

**Conclusion/Summary** : Not available.

## 12. Ecological information

**Ecotoxicity** : No known significant effects or critical hazards.

United States

### Aquatic ecotoxicity

**Conclusion/Summary** : Not available.

### Persistence/degradability

**Conclusion/Summary** : Not available.

Canada

### Aquatic ecotoxicity

**Conclusion/Summary** : Not available.

### Persistence/degradability

**Conclusion/Summary** : Not available.

**Other adverse effects** : No known significant effects or critical hazards.

3/13/2013.

7/10

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## 13. Disposal considerations

### Waste disposal

: The generation of waste should be avoided or minimized wherever possible. 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. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. 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. 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.

## 14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*
<b>DOT Classification</b>	UN2811	Toxic solids, organic, n.o.s. (5,5'-diphenyl-3,3'-bis(4-nitrophenyl)-2,2'-(3,3'-dimethoxybiphenyl-4,4'-ylene)ditetrazolium dichloride)	6.1	III
<b>IATA-DGR Class</b>	Not available.	Not available.	Not available.	-

PG\* : Packing group

## 15. Regulatory information

United States

**HCS Classification** : Irritating material  
Target organ effects

**U.S. Federal regulations** : **TSCA 8(a) IUR Exempt/Partial exemption**: Not determined  
**United States inventory (TSCA 8b)**: This material is listed or exempted.

**SARA 302/304/311/312 extremely hazardous substances**: No products were found.

**SARA 302/304 emergency planning and notification**: No products were found.

**SARA 302/304/311/312 hazardous chemicals**: 5,5'-diphenyl-3,3'-bis(4-nitrophenyl)-2,2'-(3,3'-dimethoxybiphenyl-4,4'-ylene)ditetrazolium dichloride

**SARA 311/312 MSDS distribution - chemical inventory - hazard identification**: 5,5'-diphenyl-3,3'-bis(4-nitrophenyl)-2,2'-(3,3'-dimethoxybiphenyl-4,4'-ylene)ditetrazolium dichloride: Immediate (acute) health hazard

**Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** : Not listed

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

3/13/2013.

8/10

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## 15. Regulatory information

Clean Air Act Section 602 : Not listed

Class II Substances

DEA List I Chemicals : Not listed

(Precursor Chemicals)

DEA List II Chemicals : Not listed

(Essential Chemicals)

### State regulations

Massachusetts : This material is not listed.

New York : This material is not listed.

New Jersey : This material is not listed.

Pennsylvania : This material is not listed.

United States inventory : This material is listed or exempted.

(TSCA 8b)

### Canada

WHMIS (Canada) : Class D-2B: Material causing other toxic effects (Toxic).

### Canadian lists

Canadian NPRI : This material is not listed.

CEPA Toxic substances : This material is not listed.

Canada inventory : This material is listed or exempted.

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

### International regulations

International lists : Australia inventory (AICS): This material is listed or exempted.

China inventory (IECSC): Not determined.

Japan inventory: Not determined.

Korea inventory: This material is listed or exempted.

Malaysia Inventory (EHS Register): Not determined.

New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.

Philippines inventory (PICCS): Not determined.

Taiwan inventory (CSNN): Not determined.

## 16. Other information

Label requirements : CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED. CAN CAUSE TARGET ORGAN DAMAGE.

Hazardous Material Information System (U.S.A.) :

Health	2
Flammability	0
Physical hazards	0

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

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

3/13/2013.

9/10

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## 16. Other information



Date of printing : 3/13/2013.

Date of issue : 3/13/2013.

Date of previous issue : 1/7/2011.

Version : 1.01

Prepared by : MSDS (Regulatory Specialist)

Indicates information that has changed from previously issued version.

### 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.

3/13/2013.

10/10

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