

# MATERIAL SAFETY DATA SHEET

**SRM Supplier:** National Institute of Standards and Technology  
Standard Reference Materials Program  
100 Bureau Drive, Stop 2321  
Gaithersburg, Maryland 20899-2321

**SRM Number:** 191c  
**MSDS Number:** 191c  
**SRM Name:** pH Standards,  
Sodium Bicarbonate (191-I-c);  
Sodium Carbonate (191-II-c)  
**Date of Issue:** 15 December 2003

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## SECTION I. MATERIAL IDENTIFICATION

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**Material Name:** pH Standards: Sodium Bicarbonate (191-I-c); Sodium Carbonate (191-II-c)

**Description:** A unit of SRM 191c consists of 25 g of sodium bicarbonate (191-I-c) and 30 g of sodium carbonate (191-II-c), each contained in its respective clear glass bottle.

**Other Designations:** **Sodium Bicarbonate** (baking soda; bicarbonate of soda; monosodium carbonate; carbonate acid; monosodium hydrogen carbonate; sodium acid carbonate; sodium hydrogen carbonate); **Sodium Carbonate** (carbonic acid; disodium salt; bisodium carbonate; calcined soda; carbonic acid sodium salt; disodium carbonate; soda; soda ash)

Name	Chemical Formula	CAS Registry Number
Sodium Bicarbonate	NaHCO <sub>3</sub>	144-55-8
Sodium Carbonate	Na <sub>2</sub> CO <sub>3</sub>	497-19-8

**DOT Classification:** Sodium Bicarbonate and Sodium Carbonate are not regulated by DOT.

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## SECTION II. HAZARDOUS INGREDIENTS

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Hazardous Component	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Sodium Bicarbonate	100	ACGIH TLV/OSHA PEL: not established
		Human, Infant, Oral TD <sub>Lo</sub> : 1260 mg/kg
		Man, Intermittent Oral TD <sub>Lo</sub> : 20 mg/kg/5 d
		Rat, Oral LD <sub>50</sub> : 4220 mg/kg
		Rat, Inhalation LC: > 900 mg/m <sup>3</sup>
Sodium Carbonate	100	ACGIH TLV/ OSHA PEL: not established
		Man, Oral LD <sub>Lo</sub> : 714 mg/kg
		Human, Inhalation TC <sub>Lo</sub> : 40 mg/m <sup>3</sup> /1 min
		Rat, Oral LD <sub>50</sub> : 4090 mg/kg

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**SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS**

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Sodium Bicarbonate	Sodium Carbonate
<b>Appearance and Odor:</b> white, powder; no odor	<b>Appearance and Odor:</b> white, powder and granules; no odor
<b>Molecular Weight:</b> 84.01	<b>Molecular Weight:</b> 105.99
<b>Specific Gravity (water = 1):</b> 2.159	<b>Specific Gravity (water = 1):</b> 2.536
<b>Boiling Point:</b> not applicable	<b>Boiling Point:</b> decomposes
<b>Melting Point:</b> not applicable	<b>Melting Point:</b> 851 °C
<b>pH:</b> 8.3 (0.84 % solution)	<b>pH:</b> 11.5 (1 % aqueous solution)
<b>Solvent Solubility:</b> slightly soluble in alcohol	<b>Solvent Solubility:</b> soluble in glycerol; insoluble in alcohol, acetone
<b>Water Solubility:</b> 8.6 g/100 ml water @ 20 °C	<b>Water Solubility:</b> 45.5g/100 ml water @ 100 °C

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**SECTION IV. FIRE AND EXPLOSION HAZARD DATA**

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**Sodium Bicarbonate and Sodium Carbonate:**

**Flash Point:** Not Applicable    **Method Used:** Not Applicable    **Autoignition Temperature:** Not Applicable

**Flammability Limits in Air (Volume %):**    **UPPER:** Not Applicable  
**LOWER:** Not Applicable

**Unusual Fire and Explosion Hazards:** These materials are negligible fire hazards.

**Extinguishing Media:** Use extinguishing agents appropriate for surrounding fire.

**Special Fire Procedures:** Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full-face piece in the pressure demand or positive mode and other protective clothing.

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**SECTION V. REACTIVITY DATA**

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**Sodium Bicarbonate and Sodium Carbonate:**

**Stability:**      X   Stable                           Unstable

**Conditions to Avoid:** Avoid moisture, heat, and incompatibles.

**Hazardous Polymerization:**                           Will Occur                      X   Will Not Occur

**Incompatibility (Materials to Avoid):**

**Sodium Bicarbonate:** This material is incompatible with acids, combustible materials, and metals, and may react violently with strong acids to release carbon dioxide.

**Sodium Carbonate:** This material is incompatible with acids, metals, combustible materials, halogens, and reducing agents, and may react violently with strong acids to release carbon dioxide.

**Hazardous Decomposition or Byproducts:**

**Sodium Bicarbonate:** Thermal decomposition can produce oxides of carbon.

**Sodium Carbonate:** Thermal decomposition can produce oxides of carbon and oxides of sodium.

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**SECTION VI. HEALTH HAZARD DATA**

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**Route of Entry (Sodium Bicarbonate and Sodium Carbonate):**

  X   Inhalation      X   Skin                        X   Ingestion

**Health Hazards (Acute and Chronic):** **Sodium Bicarbonate** is irritating to the eyes, skin, and respiratory system and may be harmful if swallowed.

**Eye Contact:** Direct eye contact of sodium bicarbonate may cause irritation with redness and pain. There is no data for chronic exposure to the eyes.

**Skin Contact:** Prolonged contact to the skin may cause irritation. Intermittent exposure of sodium bicarbonate for three days may cause mild irritation.

**Inhalation:** Inhalation of sodium bicarbonate may cause throat soreness and coughing. Dust may irritate the nose, throat, and lungs. There is no date for chronic exposure.

**Ingestion:** Ingestion of sodium bicarbonate may cause irritation of the mouth, esophagus, and stomach. In the stomach, carbon dioxide gas may be released, causing distention, belching, and possible rupture of the stomach. Chronic exposure may cause weight gain.

**Sodium Carbonate** is irritating to the eyes, skin, and respiratory system. Ingestion may be harmful.

**Eye Contact:** Eye contact of sodium carbonate dust may cause severe irritation with redness, pain, and blurred vision. In solution, sodium carbonate is sufficiently alkaline to damage the corneal epithelium, but if promptly washed from the eyes with water, it is unlikely to cause permanent damage to the corneal stroma. Concentrated solution may cause necrosis of the eye. Chronic exposure to the eyes may cause conjunctivitis.

**Skin Contact:** Exposure to the skin may cause mild irritation and redness. Repeated and prolonged exposure may cause dermatitis. Sensitivity reactions may occur from repeated exposures.

**Inhalation:** Inhalation of sodium carbonate dust or vapors may cause mucous membrane irritation with coughing, shortness of breath, and gastrointestinal changes. Chronic exposure may cause perforation of the nasal septum.

**Ingestion:** Ingestion of sodium carbonate may cause corrosion of the gastric mucosa with sore throat and pain. It may also cause gastrointestinal disturbances. Death is generally due to circulatory collapse. The estimated lethal human dose is approximately 30 grams. No adverse effects have been reported from chronic exposure to small amounts.

**Listed as a Carcinogen/Potential Carcinogen (Sodium Bicarbonate and Sodium Carbonate):**

	<b>Yes</b>	<b>No</b>
In the National Toxicology Program (NTP) Report on Carcinogens	<u>      </u>	<u>  X  </u>
In the International Agency for Research on Cancer (IARC) Monographs	<u>      </u>	<u>  X  </u>
By the Occupational Safety and Health Administration (OSHA)	<u>      </u>	<u>  X  </u>

## EMERGENCY AND FIRST AID PROCEDURES:

### Sodium Bicarbonate and Sodium Carbonate:

**Eye Contact:** Flush eyes with plenty of water for at least 15 minutes. Obtain immediate medical attention.

**Skin Contact:** Wash skin with soap and water for at least 15 minutes. Remove contaminated clothing and shoes. If necessary, obtain medical assistance.

**Inhalation:** If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Obtain immediate medical attention.

**Ingestion:** If a large amount of **Sodium Bicarbonate** is swallowed, obtain immediate medical attention. If a large amount of **Sodium Carbonate** is swallowed, DO NOT induce vomiting. Give large amounts of water or milk. If person is unconscious, turn head to side. Get immediate medical attention.

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## SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

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### Sodium Bicarbonate and Sodium Carbonate:

**Steps to be Taken in Case Material Is Released or Spilled:** Collect spilled material in appropriate container for disposal.

**Waste Disposal:** Follow all federal, state, and local regulations.

**Handling and Storage:** Store and handle in accordance with all current regulations and standards. Store with caps tightly closed in a dry environment, and under normal laboratory temperature. Keep separated from incompatible substances.

**NOTE:** Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

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## SECTION VIII. SOURCE DATA/OTHER COMMENTS

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**Sources:** MDL Information Systems, Inc., MSDS *Sodium Bicarbonate*, 19 March 2003.  
MDL Information Systems, Inc., MSDS *Sodium Carbonate*, 19 March 2003.

**Disclaimer:** Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was carefully prepared, using current references; however, NIST does not certify the data in the MSDS. The certified value for this material is given in the NIST Certificate of Analysis.