



Scientific Documentation

B1068, Benzalkonium Chloride Solution,
50 Percent, NF

Not appropriate for regulatory submission.
Please visit www.spectrumchemical.com or
contact Tech Services for the most up-to-date
information contained in this information
package.

Spectrum Chemical Mfg Corp

769 Jersey Avenue
New Brunswick, NJ 08901
Phone 732.214.1300

Ver4.02 4.May.2016



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To accomplish our mission, Spectrum utilizes our sourcing leverage and supplier qualification expertise in offering one of the industry's most comprehensive line of fine chemical products under one brand, in packaging configurations designed to meet your research and production requirements. Our product grades include: USP, NF, BP, EP, JP, FCC, ACS, KSA, Reagent grade, as well as DEA controlled substances. We operate facilities in the United States on the East Coast, West Coast, as well as in Shanghai, China in order to provide the best logistical support for our customers.

At Spectrum, Quality is priority number one. Suppliers with the best qualifications are preferred and we employ full-functioning in-house analytical laboratories at each of our facilities. Our facilities and systems are USFDA registered and ISO certified. We frequently host customer audits and cherish opportunities for improvements. Quality is engrained into our culture. Quality is priority number one.

In the following pages, we have designed and prepared documented scientific information to aid you in your initial qualification or your continual use of our products. Please do not hesitate to contact us if further information or the most up-to-date documentation is desired from any of the covered areas.

We appreciate your business and we look forward to hearing from you.

Sincerely,

A handwritten signature in black ink, appearing to read "Alan Wang", with a large, sweeping flourish at the end.

Alan Wang, MSQA, ASQ CQA
Senior Manager of Technical Services
techservices@spectrumchemical.com

4.May.2016

B1068, Benzalkonium Chloride Solution, 50 Percent, NF

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Specification for Benzalkonium Chloride Solution, 50 Percent, NF (B1068)

Item Number	B1068
Item	Benzalkonium Chloride Solution, 50 Percent, NF
CAS Number	
Molecular Formula	
Molecular Weight	
MDL Number	
Synonyms	

Test	Specification	
	Min	Max
ASSAY	47.5 - 52.5 %	
RATIO OF ALKYL COMPONENTS	TO PASS TEST	
LIMITS OF AMINES AND AMINE SALTS	TO PASS TEST	
ALCOHOL CONTENT		10 %
ACIDITY OR ALKALINITY	TO PASS TEST	
LIMIT OF BENZYL ALCOHOL		0.5 %
LIMIT OF BENZYL BENZALDEHYDE		0.15 %
LIMIT OF (CHLOROMETHYL) BENZENE		0.05 %
IDENTIFICATION		TO PASS TEST
RETEST DATE		
RESIDUAL SOLVENTS		TO PASS TEST

Spectrum Chemical Mfg Corp

Corporate Headquarters:
769 Jersey Ave.
New Brunswick, NJ 08901
732.214.1300

West Coast Facility:
14422 S. San Pedro St.
Gardena, CA 90248
310.516.8000

SAFETY DATA SHEET

Preparation Date: 5/07/2015

Revision Date: 05/07/2015

Revision Number: G1

Product identifier

Product code: B1068
Product Name: BENZALKONIUM CHLORIDE, 50 PERCENT SOLUTION, NF

Other means of identification

Synonyms: No information available
CAS #: Mixture
RTECS # Not available
Cl#: Not available

Recommended use of the chemical and restrictions on use

Recommended use: No information available.
Uses advised against No information available

Supplier: Spectrum Chemical Mfg. Corp
 14422 South San Pedro St.
 Gardena, CA 90248
 (310) 516-8000

Order Online At: <https://www.spectrumchemical.com>

Emergency telephone number Chemtrec 1-800-424-9300
Contact Person: Martin LaBenz (West Coast)
Contact Person: Ibad Tirmiz (East Coast)

2. HAZARDS IDENTIFICATION

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 1
Serious eye damage/eye irritation	Category 1
Respiratory sensitization	Category 1B
Skin sensitization	Category 1B
Reproductive toxicity	Category 1B
Specific target organ toxicity (repeated exposure)	Category 1
Flammable liquids	Category 3

Label elements

Danger

Hazard statements

Harmful if swallowed
Causes severe skin burns and eye damage
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause an allergic skin reaction
May damage fertility or the unborn child
Causes damage to organs through prolonged or repeated exposure
Flammable liquid and vapor



Hazards not otherwise classified (HNOC)

Not Applicable

Other hazards

May be harmful in contact with skin

Precautionary Statements - Prevention

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Do not breathe dust/fume/gas/mist/vapors/spray
In case of inadequate ventilation wear respiratory protection
Contaminated work clothing should not be allowed out of the workplace
Wear protective gloves/protective clothing/eye protection/face protection
Wear respiratory protection
Keep away from heat/sparks/open flames/hot surfaces. — No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/./? /equipment
Use only non-sparking tools
Take precautionary measures against static discharge

Precautionary Statements - Response

Immediately call a POISON CENTER or doctor/physician
Specific treatment (see .? on this label)

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In case of fire: Use CO₂, dry chemical, or foam to extinguish.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Immediately call a POISON CENTER or doctor/physician.

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower

Wash contaminated clothing before reuse

If skin irritation or rash occurs: Get medical advice/attention

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell

Rinse mouth

Do NOT induce vomiting

Precautionary Statements - Storage

Store locked up

Store in a well-ventilated place. Keep cool

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS-No.	Weight %	Trade Secret
Benzalkonium Chloride 8001-54-5	8001-54-5	50	*
Water 7732-18-5	7732-18-5	46	*
Ethyl Alcohol 200 proof 64-17-5	64-17-5	4	*

4. FIRST AID MEASURES

First aid measures

General Advice:

Poison information centers in each State capital city can provide additional assistance for scheduled poisons (13 1126). Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Skin Contact:

Wash off immediately with soap and plenty of water. Continue flushing with plenty of water for at least 15 minutes. Remove all contaminated clothes and shoes. Immediate medical attention is required. Call a physician or Poison Control Centre immediately.

Eye Contact:

Flush eye with water for 15 minutes. Immediate medical attention is required. Call a physician immediately.

Inhalation:

Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. WARNING! It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled or ingested material is toxic, infectious or corrosive. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Get medical attention.

Ingestion:

Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Obtain medical attention.

Most important symptoms and effects, both acute and delayed

Symptoms

Severe skin and eye irritation or burns. Causes eye damage. May cause allergic skin reaction. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause chemical burns to the respiratory tract. Causes digestive (gastrointestinal) tract irritation. May cause gastrointestinal (digestive) tract burns. Can burn mouth, throat, and stomach. Dyspnea (Shortness of breath and difficulty breathing). May cause pulmonary edema. May affect the cardiovascular system. Central nervous system effects. May affect the liver. It may affect the kidneys.

Indication of any immediate medical attention and special treatment needed

Notes to Physician:

Treat symptomatically

Protection of first-aiders

First-Aid Providers: Avoid exposure to blood or body fluids. Wear gloves and other necessary protective clothing. Dispose of contaminated clothing and equipment as bio-hazardous waste

5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media:

Carbon dioxide (CO₂). Dry chemical. Alcohol-resistant foam. Water spray.

Unsuitable Extinguishing Media:

Do not use a solid (straight) water stream as it may scatter and spread fire.

Specific hazards arising from the chemical

Hazardous Combustion Products:

Carbon oxides

Specific hazards:

Flammable
May be ignited by heat, sparks or flames
Container explosion may occur under fire conditions or when heated
Vapor may travel considerable distance to source of ignition and flash back
Vapors may form explosive mixtures with air
Most vapors are heavier than air. They will spread along the ground and collect in low or confined areas (sewers, basements, tanks)

Special Protective Actions for Firefighters

Specific Methods:

Water mist may be used to cool closed containers. For larger fires, use water spray or fog. Cool containers with flooding quantities of water until well after fire is out. Dike fire-control water for later disposal; do not scatter the material.

Special Protective Equipment for Firefighters:

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions: Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Avoid contact with skin, eyes and clothing. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Use personal protective equipment. Remove all sources of ignition. Pay attention to flashback. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use spark-proof tools and explosion-proof equipment. In case of large spill, water spray or vapor suppressing foam may be used to reduce vapors, but may not prevent ignition in closed spaces.

Environmental precautions Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Prevent entry into waterways, sewers, basements or confined areas.

Methods and material for containment and cleaning up

Methods for containment Stop leak if you can do it without risk. Absorb spill with inert material (e.g. vermiculite, dry sand or earth). In case of large spill, dike if needed. Dike far ahead of liquid spill for later disposal.

Methods for cleaning up Use appropriate tools to put the spilled material in a suitable chemical waste disposal container. Use only non-sparking tools. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical Measures/Precautions:

Provide sufficient air exchange and/or exhaust in work rooms. Remove all sources of ignition. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Keep away from incompatible materials.

Safe Handling Advice

Wear personal protective equipment. Use only in well-ventilated areas. Avoid contact with skin, eyes and clothing. Keep away from heat and sources of ignition. Do not breathe vapors or spray mist. Do not ingest. When using do not smoke. Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Technical Measures/Storage Conditions:

Keep container tightly closed in a dry and well-ventilated place. Store at room temperature in the original container. Keep away from heat and sources of ignition. Store away from incompatible materials. Store in a segregated and approved area.

Incompatible Materials:

Strong oxidizing agents. Nitrates. Anionic surfactants.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

National occupational exposure limits

United States

Components	OSHA	NIOSH	ACGIH	AIHA WHEEL
Benzalkonium Chloride 8001-54-5	None	None	None	None
Water 7732-18-5	None	None	None	None

Ethyl Alcohol 200 proof 64-17-5	1000 ppm TWA 1900 mg/m ³ TWA	1000 ppm TWA 1900 mg/m ³ TWA	1000 ppm STEL	None
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Canada

Components	Alberta	British Columbia	Ontario	Quebec
Benzalkonium Chloride 8001-54-5	None	None	None	None
Water 7732-18-5	None	None	None	None
Ethyl Alcohol 200 proof 64-17-5	1000 ppm TWA 1880 mg/m ³ TWA	1000 ppm STEL	1000 ppm STEL	1000 ppm TWAEV 1880 mg/m ³ TWAEV

Australia and Mexico

Components	Australia	Mexico
Benzalkonium Chloride 8001-54-5	None	None
Water 7732-18-5	None	None
Ethyl Alcohol 200 proof 64-17-5	1000 ppm TWA 1880 mg/m ³ TWA	1000 ppm TWA 1900 mg/m ³ TWA

Appropriate engineering controls

Engineering measures to reduce exposure:

Ensure adequate ventilation. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors and mist below their respective threshold limit value.

Individual protection measures, such as personal protective equipment

Personal Protective Equipment

Eye protection: Face-shield

Skin and body protection: Chemical resistant apron. Long sleeved clothing. Gloves.

Respiratory protection: Vapor respirator. Be sure to use an approved/certified respirator or equivalent.

Hygiene measures: Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. When using, do not eat, drink or smoke.

9. PHYSICAL AND CHEMICAL PROPERTIES

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Liquid	Appearance: No information available	Color: Clear. Colorless.
Odor: Aromatic.	Taste Bitter.	Molecular/Formula weight: No information available
Formula: No information available	Flammability: flammable	Flash point (°C): 52.2
Flashpoint (°C/°F): 52.2°-56.1°C/126°-132.98°F	Flash Point Tested according to: Closed cup	Lower Explosion Limit (%): No information available
Upper Explosion Limit (%): No information available	Autoignition Temperature (°C/°F): No information available	pH: No information available
Melting point/range(°C/°F): No information available	Boiling point/range(°C/°F): No information available	Decomposition temperature(°C/°F): No information available
Bulk density: No information available	Specific gravity: No information available	Vapor pressure @ 20°C (kPa): No information available
Density (g/cm3): 0.97 @ 25 deg. C	Evaporation rate: No information available	Vapor density: >1
VOC content (g/L): No information available	Odor threshold (ppm): The highest known value is 100 ppm (Ethyl alcohol 200 Proof)	Partition coefficient (n-octanol/water): No information available
Viscosity: No information available	Miscibility: No information available	Solubility: Easily soluble in cold water Easily soluble in hot water Partially soluble in diethyl ether Soluble in Acetone Soluble in Methanol

10. STABILITY AND REACTIVITY

Reactivity

Reactive with strong oxidizing agents

Chemical stability

Stability:

Stable under recommended storage conditions

Possibility of Hazardous Reactions:

Hazardous polymerization does not occur

Conditions to avoid:

Heat. Ignition sources. Incompatible materials.

Incompatible Materials:

Strong oxidizing agents. Nitrates. Anionic surfactants.

Hazardous decomposition products:

No information available

Other Information

Corrosivity:

No information available

Special Remarks on Corrosivity:

No information available

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11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Principal Routes of Exposure:

Eyes. Skin. Ingestion. Inhalation.

Acute Toxicity

The following values are calculated based on chapter 3.1 of the GHS document .

ATEmix (oral) 479mg/kg

Component Information

Benzalkonium Chloride - 8001-54-5

LD50/oral/rat = 240 mg/kg Oral LD50 Rat

LD50/oral/mouse = No information available

LD50/dermal/rat = No information available

LD50/dermal/rabbit = No information available

LC50/inhalation/rat = No information available

LC50/inhalation/mouse = No information available

Other LD50 or LC50 information = No information available

Water - 7732-18-5

LD50/oral/rat = > 90 mL/kg Oral LD50 Rat

LD50/oral/mouse = No information available

LD50/dermal/rat = No information available

LD50/dermal/rabbit = No information available

LC50/inhalation/rat = No information available

LC50/inhalation/mouse = No information available

Other LD50 or LC50 information = No information available

Ethyl Alcohol 200 proof - 64-17-5

LD50/oral/rat = 7060 mg/kg Oral LD50 Rat

LD50/oral/mouse = 3450 mg/kg

LD50/dermal/rat = No information available

LD50/dermal/rabbit = No information available

LC50/inhalation/rat = 124.7 mg/L Inhalation LC50 Rat 4 h

LC50/inhalation/mouse = 39000 mg/m³ 4 h

Other LD50 or LC50 information = >60000 ppm Inhalation LC50 Mouse 1 h

5900 mg/m³ Inhalation LC50 Rat 6 h

20000 ppm Inhalation LC50 Rat 10 h

5560 mg/kg Oral LD50 Guinea Pig

6300 mg/kg Oral LD50 Rabbit

Product Information

LD50/oral/rat =

VALUE- Acute Tox Oral = No information available

LD50/oral/mouse =

Value - Acute Tox Oral = No information available

LD50/dermal/rabbit

VALUE-Acute Tox Dermal = No information available

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LD50/dermal/rat

VALUE -Acute Tox Dermal = No information available

LC50/inhalation/rat

VALUE-Vapor = No information available

VALUE-Gas = No information available

VALUE-Dust/Mist = No information available

LC50/Inhalation/mouse

VALUE-Vapor = No information available

VALUE - Gas = No information available

VALUE - Dust/Mist = No information available

Symptoms**Skin Contact:** Causes severe irritation and burns. May be harmful in contact with skin. May cause allergic skin reaction.**Eye Contact:** Causes severe eye irritation and possible burns.**Inhalation** May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause respiratory tract and mucous membrane irritation with sore throat, coughing, shortness of breath, and delayed lung edema. May cause chemical burns to the respiratory tract. High vapor concentrations may cause nervous system effects.**Ingestion** Harmful if swallowed. Causes gastrointestinal/digestive tract irritation and burns. May affect behavior (central nervous system depression, depression) and metabolism. May produce burning pains in the mouth, throat, and abdomen, profuse salivation, muscle weakness. May also affect the respiratory system and cardiovascular system, liver and kidneys.**Aspiration hazard** No information available**Delayed and immediate effects as well as chronic effects from short and long-term exposure****Chronic Toxicity** Prolonged or repeated skin contact may cause dermatitis. Repeated contact may cause allergic reactions in very susceptible persons.. Prolonged or repeated ingestion may cause cyanosis.**Sensitization:** May cause sensitization by inhalation and skin contact**Mutagenic Effects:** May affect genetic material
Experiments with bacteria and/or yeast have shown mutagenic effects**Carcinogenic effects:** Not considered carcinogenic

Components	IARC	ACGIH - Carcinogens	NTP	OSHA HCS - Carcinogens	Australia - Prohibited Carcinogenic Substances	Australia - Notifiable Carcinogenic Substances
Benzalkonium Chloride	Not listed	Not listed	Not listed	Not listed	Not listed	Not listed
Water	Not listed	Not listed	Not listed	Not listed	Not listed	Not listed
Ethyl Alcohol 200 proof	Group 1 - Monograph 100E [2012] in alcoholic beverages Monograph 96 [2010] in alcoholic beverages	A3 Confirmed Animal Carcinogen with Unknown Relevance to Humans	Not listed	Present	Not listed	Not listed

Reproductive toxicity No data is available

Reproductive Effects: May cause adverse reproductive effects based on animal data
Benzalkonium Chloride is an active ingredient in vaginal spermicides. When applied in the vagina of pregnant rats at much higher doses than those used in spermicides, it caused increased resorptions leading to fetal death, and reduced litter size and weight. No adverse reproductive effects have been reported after oral treatment of rats and guinea pigs and dermal administration to rats
May impair fertility
May cause harm to the unborn child

Developmental Effects: No information available

Teratogenic Effects: No information available

Specific Target Organ Toxicity

STOT - single exposure No information available

STOT - repeated exposure Causes damage to organs through prolonged or repeated exposure.

Target Organs: Cardiovascular system. Gastrointestinal tract. Heart. Kidneys. Reproductive System. Skin.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity effects: Aquatic environment.

Benzalkonium Chloride - 8001-54-5

Freshwater Fish Species Data: 2.4 mg/L LC50 *Oryzias latipes* 96 h semi-static 1
0.223-0.46 mg/L LC50 *Lepomis macrochirus* 96 h static 1
0.823-1.61 mg/L LC50 *Oncorhynchus mykiss* 96 h static 1
1.3 mg/L LC50 *Poecilia reticulata* 96 h semi-static 1

Ethyl Alcohol 200 proof - 64-17-5

Freshwater Fish Species Data: 12.0 - 16.0 mL/L LC50 *Oncorhynchus mykiss* 96 h static 1
13400 - 15100 mg/L LC50 *Pimephales promelas* 96 h flow-through 1
100 mg/L LC50 *Pimephales promelas* 96 h static 1

Water Flea Data: 9268 - 14221 mg/L LC50 *Daphnia magna* 48 h
10800 mg/L EC50 *Daphnia magna* 24 h
2 mg/L EC50 *Daphnia magna* 48 h

Persistence and degradability: No information available

Bioaccumulative potential: No information available

Mobility: No information available

13. DISPOSAL CONSIDERATIONS

Disposal Methods

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products:

Waste must be disposed of in accordance with Federal, State and Local regulation.

Contaminated packaging:

Empty containers should be taken for local recycling, recovery or waste disposal

Components	RCRA - F Series Wastes	RCRA - K Series Wastes	RCRA - P Series Wastes	RCRA - U Series Wastes
Benzalkonium Chloride	None	None	None	None
Water	None	None	None	None
Ethyl Alcohol 200 proof	None	None	None	None

14. TRANSPORT INFORMATION

DOT

UN-No: UN2920
Proper Shipping Name: Corrosive liquids, flammable, n.o.s. (Benzalkonium Chloride solution)
Hazard Class: 8
Subsidiary Risk: 3
Packing Group: II
ERG No: 132
Marine Pollutant: No data available
DOT RQ (lbs): No information available

Symbol(s):

G

TDG (Canada)

UN-No: UN2920
Proper Shipping Name: Corrosive liquid, flammable, n.o.s.
Hazard Class: 8
Subsidiary Risk: (3)
Packing Group: II
Description: No information available

ADR

UN-No: UN2920
Proper Shipping Name: Corrosive liquid, flammable, n.o.s.
Hazard Class: 8
Packing Group: II
Subsidiary Risk: 3
Classification Code: No information available
Description: No information available
CEFIC Tremcard No: No information available

IMO / IMDG

UN-No: UN2920
Proper Shipping Name: Corrosive liquid, flammable, n.o.s.
Hazard Class: 8
Subsidiary Risk: 3
Packing Group: II
Description: No information available
IMDG Page: No information available
Marine Pollutant: No information available
EMS: F-E
MFAG: No information available

14. TRANSPORT INFORMATION

Maximum Quantity: No information available

RID

UN-No: UN2920
Proper Shipping Name: Corrosive liquid, flammable, n.o.s.
Hazard Class: 8
Subsidiary Risk: 3
Packing Group: II
Classification Code: No information available
Description: No information available

ICAO

UN-No: UN2920
Proper Shipping Name: Corrosive liquid, flammable, n.o.s.
Hazard Class: 8
Subsidiary Risk: 3
Packing Group: II
Description: No information available

IATA

UN-No: UN2920
Proper Shipping Name: Corrosive liquid, flammable, n.o.s.
Hazard Class: 8
Subsidiary Risk: 3
Packing Group: II
ERG Code: 8F
Description: No information available

15. REGULATORY INFORMATION

International Inventories

Components	U.S. TSCA	KOREA KECL	Philippines (PICCS)	Japan ENCS	CHINA	Australia (AICS)	EINECS-No.
<i>Benzalkonium Chloride</i>	Not Listed	Present KE-00790	Present	Not present	Present	Present	Not present
<i>Water</i>	Present	Present KE-35400	Present	Not present	Present	Present	Present 231-791-2
<i>Ethyl Alcohol 200 proof</i>	Present	KE-13217	Present	(2)-202	Present	Present	Present 200-578-6

U.S. Regulations

Ethyl Alcohol 200 proof

Massachusetts RTK: Present

New Jersey RTK Hazardous Substance List: 0844

Pennsylvania RTK: Present

Minnesota - Hazardous Substance List: Present

Louisiana Reportable Quantity List for Pollutants: Present (listed as Volatile Organic Compounds)

California Directors List of Hazardous Substances: Present

FDA - Food Additives Generally Recognized as Safe (GRAS): 21 CFR 184.1293

FDA - 21 CFR - Total Food Additives 169.175 169.176 169.177 169.181 172.340 172.560 172.580 175.105 176.180 176.200
 177.1200 177.1650 178.1010 184.1293 73.30 73.345 73.615

California Prop. 65: Safe Drinking Water and Toxic Enforcement Act of 1986.

Chemicals Known to the State of California to Cause Cancer:

This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

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Product name: BENZALKONIUM
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Chemicals Known to the State of California to Cause Reproductive Toxicity:

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm (See table below)

Components	Carcinogen	Developmental Toxicity	Male Reproductive Toxicity	Female Reproductive Toxicity:
Benzalkonium Chloride	Not Listed	Not Listed	Not Listed	Not Listed
Water	Not Listed	Not Listed	Not Listed	Not Listed
Ethyl Alcohol 200 proof	Not Listed	developmental toxicity (Ethyl alcohol in alcoholic beverages)	Not Listed	Not Listed

CERCLA/SARA

Components	CERCLA - Hazardous Substances and their Reportable Quantities	Section 302 Extremely Hazardous Substances and TPQs	Section 302 Extremely Hazardous Substances and RQs	Section 313 - Chemical Category	Section 313 - Reporting <i>de minimis</i>
<i>Benzalkonium Chloride</i>	None	None	None	None	None
<i>Water</i>	None	None	None	None	None
<i>Ethyl Alcohol 200 proof</i>	None	None	None	None	None

U.S. TSCA

Components	TSCA Section 5(a)2 - Chemicals With Significant New Use Rules (SNURS)	TSCA 8(d) -Health and Safety Reporting
<i>Benzalkonium Chloride</i>	Not Applicable	Not Applicable
<i>Water</i>	Not Applicable	Not Applicable
<i>Ethyl Alcohol 200 proof</i>	Not Applicable	Not Applicable

Canada**WHMIS hazard class:**

B3 Combustible liquid
D1B Toxic materials
E Corrosive material

Benzalkonium Chloride

D1B E

Water

Uncontrolled product according to WHMIS classification criteria

Ethyl Alcohol 200 proof

B2 D2B

Canada Controlled Products Regulation:

This product has been classified according to the hazard criteria of the CPR (Controlled Products Regulation) and the MSDS contains all of the information required by the CPR.

Components	WHMIS Ingredient Disclosure List -
Ethyl Alcohol 200 proof	0.1 %

Inventory

Components	Canada (DSL)	Canada (NDSL)
Benzalkonium Chloride	Present	Not Listed
Water	Present	Not Listed
Ethyl Alcohol 200 proof	Present	Not Listed

Components	CEPA Schedule I - Toxic Substances	CEPA - 2010 Greenhouse Gases Subject to Mandatory Reporting
Benzalkonium Chloride	Not listed	Not listed
Water	Not listed	Not listed
Ethyl Alcohol 200 proof	Not listed	Not listed

EU Classification

R-phrase(s)

R10 - Flammable.

R34 - Causes burns.

R50 - Very toxic to aquatic organisms.

R21/22 - Harmful in contact with skin and if swallowed.

S -phrase(s)

S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S33 - Take precautionary measures against static discharges.

S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S37/39 - Wear suitable gloves and eye/face protection.

Components	Classification	Concentration Limits:	Safety Phrases
Benzalkonium Chloride		No information	
Water		No information	
Ethyl Alcohol 200 proof	F; R11	No information	S7 S16

The product is classified in accordance with Annex VI to Directive 67/548/EEC

Indication of danger:

T - Toxic

C - Corrosive.



16. OTHER INFORMATION

16. OTHER INFORMATION

Preparation Date: 5/07/2015
Revision Date: 05/07/2015
Prepared by: Sonia Owen

Disclaimer:

All chemicals may pose unknown hazards and should be used with caution. This Safety Data Sheet (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. The physical properties reported in this SDS are obtained from the literature and do not constitute product specifications. Information contained herein does not constitute a warranty, whether expressed or implied, as to the safety, merchantability or fitness of the goods for a particular purpose. Spectrum Chemicals & Laboratory Products, Inc. assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits, arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied. 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, Spectrum assumes no responsibility for the completeness or accuracy of the information contained herein.

End of Safety Data Sheet



Manufacturer

Product Covered: B1068, Benzalkonium Chloride Solution, 50 Percent, NF

Spectrum takes ownership as the manufacturer for the Spectrum product listed above and provides full quality assurance, customer service, and technical product support.

While information concerning the raw material manufacturer of our starting materials is considered proprietary, such information can be made available upon request contingent on demonstration of business volume justification and successful execution of confidential disclosure agreement (CDA).

Requests for disclosure of proprietary raw material manufacturer information may be submitted to the assigned account representative for consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Alan Wang", is written over a light gray rectangular background.

Alan Wang, MSQA, ASQ CQA
Senior Manager of Technical Services
techservices@spectrumchemical.com

4.May.2016

Certificate of Registration



Intertek

This is to certify that the quality management system of

Spectrum Chemicals and Laboratory Products, Inc

Main Site: 14422 South San Pedro Street, Gardena, California, 90248, USA

Additional Sites: 13915 South Main Street, Los Angeles, California, 90061, USA

755 Jersey Avenue, New Brunswick, New Jersey, 08901, USA

769 Jersey Avenue, New Brunswick, New Jersey, 08901, USA

7400 North Oracle Road, Suite 221, Tucson, Arizona, 85704, USA

has been assessed and registered by Intertek as conforming to the requirements of

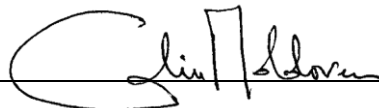
ISO 9001:2008

The quality management system is applicable to

California and New Jersey sites: The manufacture and distribution of specialty fine chemicals, solutions, equipment, supplies and products for the laboratory, pharmaceutical, food, healthcare, cosmetic, fragrance, biotechnology, environmental and process industries.

Arizona site: Supporting Spectrum's two manufacturing facilities by: selecting and qualifying distributors of Laboratory and Safety Equipment; processing bids and quotes to generate new sales opportunities; sourcing bulk chemicals in support of bulk bids and quotes; assisting production operations through order expediting and IT infrastructure support.

Certificate Number: 94-316m-01
Initial Certification Date: 27 December 1994
Certificate Issue Date: 29 January 2016
Certificate Expiry Date: 14 September 2018



Calin Moldovean, President
Intertek Testing Services NA, Inc.
900 Chelmsford Street, Suite 301-3, Lowell, MA, USA



In the issuance of this certificate, Intertek assumes no liability to any party other than to the Client, and then only in accordance with the agreed upon Certification Agreement. This certificate's validity is subject to the organization maintaining their system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone.

The certificate remains the property of Intertek, to whom it must be returned upon request.

CT-ISO 9001-2008-ANAB-EN-LT-L-26.jun.15

Certificate of Registration

Intertek

This is to certify that the quality management system of

Spectrum China Ltd.

Building A20, No. 3802, Shengang Road, Songjiang District, Shanghai, China

has been assessed and registered by Intertek as conforming to the requirements of

ISO 9001: 2008

The quality management system is applicable to:

Provision of service of purchase, testing and sales for chemical products, repacking of non-hazardous chemical products.

Organization Code: 77762704-8
Certificate Number: 111310001-01
Certificate Issue Date: 17 November 2015
Certificate Expiry Date: 14 September 2018



014

A handwritten signature in black ink, appearing to read 'Calin Moldovean'.

Authorised Signature: Calin Moldovean – President, Business Assurance
Intertek Certification Limited, 10A Victory Park, Victory Road, Derby DE24 8ZF, United Kingdom
Intertek Certification Limited is a UKAS accredited body under schedule of accreditation no. 014.

In the issuance of this certificate, Intertek assumes no liability to any party other than to the client, and then only in accordance with the agreed upon Certification Agreement. This certificate's validity is subject to the organization maintaining their system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone.
The annual validity of the certificate can also be checked through the website <http://www.cnca.gov.cn> of CNCA in China.



The certificate remains the property of Intertek, to whom it must be returned upon request.



March 28, 2016

Certificate of cGMP

Dear Valued Customer:

Spectrum Chemicals and Laboratory Products certify that our USP, NF, FCC, EP, BP, JP, and food grade products are produced, processed, packaged and held in compliance with current Good Manufacturing Practices (cGMP) in accordance with the applicable parts of 21 CFR, parts 210 and 211 of the Code of Federal Regulations.

Spectrum is an FDA registered and inspected drug establishment. Our United States Food and Drug Administration (USFDA) Registration numbers are as follows:

Spectrum-Gardena, CA:	<u>2020632</u>
Spectrum-New Brunswick, NJ:	<u>2246824</u>
Spectrum -Shanghai, China:	<u>3006174778</u>

Thank you for your interest with Spectrum products. Please feel free to contact the Quality Assurance department at 310-516-8000 or via email at qualityassurance@spectrumchemical.com if we may be of further assistance.

Sincerely,

A handwritten signature in cursive script that reads "Michelle Weston".

Michelle Weston
Quality Assurance Specialist



April 25, 2016

Certificate of cGMP

Dear Valued Customer:

Spectrum Chemicals and Laboratory Products certify that the following product(s) is produced, processed, packaged and held in compliance with current Good Manufacturing Practices (cGMP) in accordance with the applicable parts of 21 CFR, parts 210 and 211 of the Code of Federal Regulations.

Catalog Number	Product Name
B1068	Benzalkonium Chloride Solution, 50 Percent, NF

Spectrum is an FDA registered and inspected drug establishment. Our United States Food and Drug Administration (USFDA) Registration numbers are as follows:

Spectrum-Gardena, CA: 2020632
Spectrum-New Brunswick, NJ: 2246824
Spectrum-Shanghai, China: 3006174778

Thank you for your interest with Spectrum products. Please feel free to contact the Quality Assurance department at 310-516-8000 or via email at qualityassurance@spectrumchemical.com if we may be of further assistance.

Sincerely,

Michelle Weston
Quality Assurance Specialist



May 3, 2016

Re: Benzalkonium Chloride Solution, 50 Percent, NF- B1068

To Whom It May Concern:

Thank you for your interest in Spectrum high quality chemicals.

We at Spectrum Chemical Mfr. Corp. understand the concern regarding Bovine Spongiform Encephalopathy (BSE). Please be assured that the chemical

Benzalkonium Chloride Solution, 50 Percent, NF- B1068

is BSE/TSE free.

If you have any further questions, please contact Tech Services at (310) 516-8000 Extension 5471, or by email at techservices@spectrumchemical.com.

Sincerely,

Darlene Dagdag-Lyudmirskiy
Technical Services
Spectrum Chemical Mfr. Corp.

This document has been produced electronically and is valid without a signature



May 3, 2016

Re: Benzalkonium Chloride Solution, 50 Percent, NF- B1068

To Whom It May Concern:

Thank you for your interest in Spectrum high quality chemicals.

We at Spectrum Chemical Mfr. Corp. understand the concern regarding the presence of allergens in raw materials. Please be assured that the following chemical does not contain (Milk; Egg; Fish; Shellfish; Tree nuts; Wheat; Peanuts; Soy; Cereals containing Gluten).

Benzalkonium Chloride Solution, 50 Percent, NF-B1068

If you have any further questions, please contact Tech Services at (310) 516-8000 Extension 5471, or by email at techservices@spectrumchemical.com.

Sincerely,

Darlene Dagdag-Lyudmirskiy
Technical Services
Spectrum Chemical Mfr. Corp.

This document has been produced electronically and is valid without a signature



May 3, 2016

Re: Benzalkonium Chloride Solution, 50 Percent, NF- B1068

To Whom It May Concern:

Thank you for your interest in Spectrum high quality chemicals.

We at Spectrum Chemical Mfg. Corp. understand the concern regarding Aflatoxins in raw materials. To the best of our knowledge, the product listed below is not contaminated with Aflatoxins. Aflatoxins are not used in production. The following product does not come in contact with Aflatoxins at any stage of production.

Benzalkonium Chloride Solution, 50 Percent, NF- B1068

If you have any further questions, please contact Tech Services at (310) 516-8000 Extension 5471, or by email at techservices@spectrumchemical.com.

Sincerely,

Darlene Dagdag-Lyudmirskiy
Technical Services
Spectrum Chemical Mfr. Corp.

This document has been produced electronically and is valid without a signature

Label Information

The Spectrum label presents technical and safety information in an easily understood format. Our technical specialists stay abreast of the latest requirements of the Globally Harmonized System for Classification and Labelling of Chemicals (GHS), as well as the Occupational Safety and Health Administration (OSHA), the Food and Drug Administration (FDA) and other government regulatory agencies in order to ensure compliance, accuracy and concise hazard communication.

A **DANGER**

• Causes severe skin burns and eye damage • Flammable liquid and vapor • Harmful if swallowed • May cause an allergic skin reaction • May cause allergy or asthma symptoms or breathing difficulties if inhaled • Causes damage to organs through prolonged or repeated exposure • May damage fertility or the unborn child • May be harmful in contact with skin.

• Obtain special instructions before use • Do not handle until all safety precautions have been read and understood • Keep away from heat, sparks, open flames, hot surfaces • No smoking • Ground container and receiving equipment • Use explosion-proof equipment • Use only non-sparking tools • Take precautionary measures against static discharge • Do not eat, drink or smoke when using this product • Wear respiratory protection, eye protection, face protection, protective gloves, protective clothing • Do not breathe mist or vapors • Wash face, hands and any exposed skin thoroughly after handling • Contaminated work clothing must not be allowed out of the workplace.

FIRST AID: Immediately call a POISON CENTER or physician. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical attention. IF INHALED: If breathing is difficult, remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTER or physician. IF SWALLOWED: Rinse mouth. DO NOT induce vomiting. IN CASE OF FIRE: Use dry chemical, water spray, alcohol-resistant foam or CO₂ to extinguish.

L Retest Date: 03-25-2025

B **KEEP FROM CHILDREN**

SPECTRUM[®]

B1068 **D** **F** **20 L**

Benzalkonium Chloride Solution

50%

E **N.F.**

H **CAUTION:** For manufacturing, processing or repacking. Not for pesticide use.
Read and understand the label and Safety Data Sheet (SDS) prior to use.

DOT: UN2920, Corrosive liquid, flammable, n.o.s. (benzalkonium chloride solution), 8 (3), PG II

Chemical Emergency: (800)424-9300

www.SpectrumChemical.com

K Components:

Benzalkonium Chloride CAS 8001-54-5
Water CAS 7732-18-5
Ethanol CAS 64-17-5

Assay 47.5-52.5%
Ratio of Alkyl Components To pass test
Limit of Amines and Amine Salts To pass test
Alcohol Content ?%
Acidity or Alkalinity To pass test

MAXIMUM LIMITS

Limit of Benzyl Alcohol 0.5%
Limit of Benzyl Benzaldehyde 0.15%
Limit of (Chloromethyl) Benzene 0.05%
Residual Solvents To pass test

M Lot No. 062233

W 11/E3GHS

A **D**

SPECTRUM CHEMICAL MFG. CORP.

Gardena, CA 90248 • New Brunswick, NJ 08901

- | | | |
|--|---|---|
| <p>A Bar Code</p> <p>B GHS Hazard Pictograms</p> <p>C Warning, Safety Data and Precautionary Information</p> <p>D Product Catalog Number</p> <p>E Item Name, Form, Grade</p> <p>O Storage Color Band</p> | <p>F Size/Quantity</p> <p>G Chemical Abstracts Service (CAS) Registry Number</p> <p>H Caution Information</p> <p>I DOT Shipping Information</p> <p>J Toll-Free 24-Hour Chemical Emergency Telephone Number</p> | <p>K Empirical Formula, Formula Weight and Technical Specifications Panel</p> <p>L Expiration Information</p> <p>M Lot Number</p> <p>N Kosher Certified by Kosher Supervision of America (KSA).</p> |
|--|---|---|

This color-coded band indicates the hazard most likely to be posed by that material under storage conditions. The criteria used to assign band colors have been established by the Storage Code working group of the Society for Chemical Hazard Communication (SCHC). It is recommended that like colors be stored together, unless otherwise stated, based on the color codes indicated to the right. However, it is the responsibility of the customer to check with their local fire department for possible conflicts with our recommendations when storing hazardous chemicals.

- YELLOW:** Oxidizer
- RED:** Flammable
- GREEN:** General Storage
- BLUE:** Health Hazard
- WHITE:** Corrosive

Spectrum Chemical Mfg Corp

Corporate Headquarters:

769 Jersey Ave.
New Brunswick, NJ 08901

732.214.1300

West Coast Facility:

14422 S. San Pedro St.
Gardena, CA 90248

310.516.8000

Item Number	B1068	Lot Number	1FA0515
Item	Benzalkonium Chloride Solution, 50 Percent, NF		
CAS Number			
Molecular Formula		Molecular Weight	

Test	Specification		Result
	min	max	
ASSAY	47.5 - 52.5 %		51.03 %
RATIO OF ALKYL COMPONENTS	TO PASS TEST		PASSES TEST
LIMITS OF AMINES AND AMINE SALTS	TO PASS TEST		PASSES TEST
ALCOHOL CONTENT		10 %	5.26 %
ACIDITY OR ALKALINITY	TO PASS TEST		PASSES TEST
LIMIT OF BENZYL ALCOHOL		0.5 %	<0.5 %
LIMIT OF BENZYL BENZALDEHYDE		0.15 %	<0.15 %
LIMIT OF (CHLOROMETHYL) BENZENE		0.05 %	<0.05 %
IDENTIFICATION		TO PASS TEST	PASSES TEST
RESIDUAL SOLVENTS		TO PASS TEST	PASSES TEST
RETEST DATE			26-MAR-2018
MANUFACTURE DATE			29-MAR-2015
APPEARANCE			CLEAR COLORLESS LIQUID

Spectrum Chemical Mfg Corp
14422 South San Pedro Street
Gardena 90248 CA

Certificate of Analysis Results Certified By:



Adan Hernandez
Quality Control Manager
Spectrum Chemicals & Laboratory Products



All pharmaceutical ingredients are tested using current edition of applicable pharmacopeia.

January 26, 2016

RE: Lot Numbering System

Dear Valued Customer:

This letter is to inform you of Spectrum Chemicals and Laboratory Products' Lot Numbering System. The system is based on an alpha-numerical sequence which provides the month, year and location of production.

The lot numbering system utilized until 2010 is a sequence of **six characters**, two letters followed by four numbers. The first letter represents the year, for example, Y denotes 2009 and Z denotes 2010. The second letter represents the month and site, for example, A-L denotes January through December at Spectrum's Gardena, CA facility, while M-X denotes January through December at the New Brunswick, NJ facility. The following four numbers are sequentially assigned.

Example: ZI0928 = The 928th material produced in California in September 2010

The lot numbering system utilized for 2011 and forward, is a sequence of **seven characters**. The first character, a number, represents the production facility:

- 1 = Gardena, CA Facility
- 2 = New Brunswick, NJ Facility
- 3 = China Facility

The second character, a letter, represents the year. For example, A denotes 2011 and B denotes 2012. The third character, a letter, represents the month, with A denoting January and L denoting December. The following four numbers are sequentially assigned.

Example: 2AA0706 = The 706th material produced in New Jersey in January 2011

Thank you for your interest with Spectrum products. Please feel free to contact us at 310-516-8000 or via email at qualityassurance@spectrumchemical.com if we may be of further assistance.

Sincerely,



Michael Dang
Manager, GMP Compliance



Stability – Shelf Life Guidance

Product Covered: B1068, Benzalkonium Chloride Solution, 50 Percent, NF

Spectrum Chemical's manufacturing partner has assigned the following shelf life guidance for the product listed above.

The product, B1068, Benzalkonium Chloride Solution, 50 Percent, NF, is assigned a 36 months shelf life from date of manufacturing. The quality and integrity of the chemical depends on the handling and storage conditions. Please refer to the Safety Data Sheet for proper storage and handling procedures.

Adan R. Hernandez
Quality Control Manager

A handwritten signature in black ink, appearing to read "Adan R. Hernandez".

Corporate Headquarters
769 Jersey Avenue
New Brunswick, NJ 08901-3605

4.May.2016