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.
Dear Customer,

Thank you for your interest in Spectrum’s quality products and services.

Spectrum has been proudly serving our scientific community for over 45 years. It is our mission to manufacture and distribute fine chemicals and laboratory products with Quality and delivery you can count on every time.

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,

Alan Wang, MSQA, ASQ CQA
Senior Manager, Global Supplier Quality Assurance
qualityassurance@spectrumchemical.com
**Product Specification**

**Safety Data Sheet (SDS)**

**Manufacturer**

**Manufacturing Process Flowchart**

**Certification of Quality Management System (QMS)**

**Certification of current Good Manufacturing Practices (cGMP)**

**Product BSE/TSE Statement**

**Product Allergen Statement**

**Product Aflatoxin Statement**

**General Label Information – Sample Label**

**Product Certificate of Analysis Sample(s)**

**General Lot Numbering System Guidance**

**Stability – Shelf Life Guidance**
<table>
<thead>
<tr>
<th>Item Number</th>
<th>R1005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Resorcinol, Crystalline Powder, USP</td>
</tr>
<tr>
<td>CAS Number</td>
<td>108-46-3</td>
</tr>
<tr>
<td>Molecular Formula</td>
<td>C₆H₄O₂</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>110.11</td>
</tr>
<tr>
<td>MDL Number</td>
<td></td>
</tr>
<tr>
<td>Synonyms</td>
<td>Benzene-1,3-diol ; m-Dihydroxybenzene</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSAY [C₆H₄(OH)₂]</td>
<td>99.0 - 100.5 %</td>
</tr>
<tr>
<td>MELTING RANGE</td>
<td>109 - 111 °C</td>
</tr>
<tr>
<td>LOSS ON DRYING</td>
<td>1.0 %</td>
</tr>
<tr>
<td>RESIDUE ON IGNITION</td>
<td>0.05 %</td>
</tr>
<tr>
<td>ORDINARY IMPURITIES</td>
<td>1.0 %</td>
</tr>
<tr>
<td>PHENOLS</td>
<td>TO PASS TEST</td>
</tr>
<tr>
<td>CATECHOL</td>
<td>TO PASS TEST</td>
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<td>IDENTIFICATION</td>
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<td>RETEST DATE</td>
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</tr>
<tr>
<td>RESIDUAL SOLVENTS</td>
<td>TO PASS TEST</td>
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</table>
SAFETY DATA SHEET

Product code: R1005
Product name: RESORCINOL, CRYSTALLINE POWDER, USP

Other means of identification
Synonyms:
1,3-Benzenediol
1,3-Dihydroxybenzene
3-Hydroxycyclohexadien-1-one
3-Hydroxyphenol
Benzene, 1,3-dihydroxy-
Benzene, m-dihydroxy-
C.I. 76505
C.I. Developer 4
C.I. Oxidation Base 31
Developer O
Developer R
Developer RS
Dihydroxybenzol
Durafur developer G
Fouramine RS
Fourrine 79
Fourrine EW
Nako TGG
Pelagol Grey RS
Pelagol RS
Phenol, m-hydroxy-
Resorcin
Resorcine
Resorcinol
Resorcinolum
Resorzin
m-Benzene
diol
m-Dihydroxybenzene
m-Dioxybenzene
m-Hydroquinone
m-Hydroxyphenol

CAS #: 108-46-3
RTECS #: VG9625000
CI#: Not available

Recommended use of the chemical and restrictions on use
Recommended use:
In tanning; manufacturing resins, resin adhesives, hexylresorcinol, p-amino salicylic acid, explosives, and dyes; In rubber industry for tires and reinforced rubber products; wood adhesives; pharmaceuticals; cross-linking agent; a rubber tackifier; and cosmetic; In photography; chemical intermediate used in oxidation hair dyes; medication.
2. HAZARDS IDENTIFICATION

Classification

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

<table>
<thead>
<tr>
<th>hazard classification</th>
<th>category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity - Oral</td>
<td>Category 3</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Category 2</td>
</tr>
<tr>
<td>Serious eye damage/eye irritation</td>
<td>Category 1</td>
</tr>
<tr>
<td>Specific target organ toxicity (repeated exposure)</td>
<td>Category 1</td>
</tr>
</tbody>
</table>

Label elements

Danger

Hazard statements
Toxic if swallowed
Causes serious eye damage
Causes skin irritation
Causes damage to organs through prolonged or repeated exposure

Hazards not otherwise classified (HNOC)
Not Applicable

Other hazards
May be harmful in contact with skin

Precautionary Statements - Prevention
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
Wear protective gloves
Wear eye/face protection
Precautionary Statements - Response
Specific treatment (see .? on this label)
Specific treatment (see .? on this label)
Get medical advice/attention if you feel unwell
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: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Rinse mouth

Precautionary Statements - Storage
Store locked up

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Weight %</th>
<th>Trade Secret</th>
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<tbody>
<tr>
<td>Resorcinol</td>
<td>108-46-3</td>
<td>100</td>
<td>*</td>
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</tbody>
</table>

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).

Skin Contact: Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. Get medical attention. If skin irritation persists, call a physician.

Eye Contact: Flush eye with water for 15 minutes. Get medical attention.

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: Toxic if swallowed. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Immediate medical attention is required. Call a physician or Poison Control Center immediately.

Most important symptoms and effects, both acute and delayed

Symptoms


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: Dry chemical. Carbon dioxide (CO2). Water spray mist or foam.

Unsuitable Extinguishing Media: No information available.

Specific hazards arising from the chemical
Hazardous Combustion Products: Carbon oxides
Specific hazards: May be combustible at high temperatures
Explosive reaction with concentrated nitric acid
Containers may explode when heated

Special Protective Actions for Firefighters
Specific Methods: No information available.
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. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Avoid contact with skin, eyes and clothing. Use personal protective equipment. Avoid breathing dust. Avoid dust formation. Remove all sources of ignition. All equipment used when handling the product must be grounded.

Environmental precautions: Prevent further leakage or spillage if safe to do so. Do not let product enter 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. Cover with plastic sheet to prevent spreading.
Methods for cleaning up: Use appropriate tools to put the spilled solid in a suitable waste disposal container. 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. Avoid dust formation. Remove all sources of ignition. Keep away from incompatible materials.

Safe Handling Advice: Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Avoid dust formation. Do not breathe vapours/dust. Do not ingest. Keep away from heat and sources of ignition. Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Product code: R1005 Product name: RESORCINOL, CRISTALLINE POWDER, USP
Technical Measures/Storage Conditions:

Incompatible Materials:

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

National occupational exposure limits

United States

<table>
<thead>
<tr>
<th>Components</th>
<th>OSHA</th>
<th>NIOSH</th>
<th>ACGIH</th>
<th>AIHA WHEEL</th>
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<td>10 ppm TWA</td>
<td>20 ppm STEL</td>
<td>Not determined</td>
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<tr>
<td>108-46-3</td>
<td></td>
<td>45 mg/m³ TWA</td>
<td>10 ppm TWA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 ppm STEL</td>
<td>20 ppm STEL</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>90 mg/m³ STEL</td>
<td>10 ppm TWA</td>
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</tbody>
</table>

Canada

<table>
<thead>
<tr>
<th>Components</th>
<th>Alberta</th>
<th>British Columbia</th>
<th>Ontario</th>
<th>Quebec</th>
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</thead>
<tbody>
<tr>
<td>Resorcinol</td>
<td>10 ppm TWA</td>
<td>10 ppm TWA</td>
<td>10 ppm TWA</td>
<td>10 ppm TWAEV</td>
</tr>
<tr>
<td>108-46-3</td>
<td>45 mg/m³ TWA</td>
<td>20 ppm STEL</td>
<td>45 mg/m³ TWAEV</td>
<td>20 ppm STEV</td>
</tr>
<tr>
<td></td>
<td>20 ppm STEL</td>
<td></td>
<td></td>
<td>90 mg/m³ STEV</td>
</tr>
</tbody>
</table>

Australia and Mexico

<table>
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<tr>
<th>Components</th>
<th>Australia</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resorcinol</td>
<td>20 ppm STEL</td>
<td>10 ppm TWA</td>
</tr>
<tr>
<td>108-46-3</td>
<td>90 mg/m³ STEL</td>
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</tr>
<tr>
<td></td>
<td>10 ppm TWA</td>
<td>20 ppm STEL</td>
</tr>
<tr>
<td></td>
<td>45 mg/m³ TWA</td>
<td>90 mg/m³ STEL</td>
</tr>
</tbody>
</table>

Appropriate engineering controls

Engineering measures to reduce exposure: Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Individual protection measures, such as personal protective equipment

Personal Protective Equipment

Eye protection: Goggles. Safety glasses with side-shields.

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

Respiratory protection: Wear respirator with dust filter.. Be sure to use an approved/certified respirator or equivalent..

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

9. PHYSICAL AND CHEMICAL PROPERTIES
9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid.

Odor: Characteristic.

Formula: C₆H₆O₂

Flashpoint (°C/°F): 127.2°C/ 261°F

Upper Explosion Limit (%): No information available

Melting point/range(°C/°F): 110°C/ 230°F

Bulk density: No information available

Density (g/cm³): No information available

VOC content (g/L): No information available

Viscosity: No information available

Appearance: Crystalline powder. Crystals.

Taste: Sweet with bitter after taste.

Flammability: No information available

Flash Point Tested according to: Closed cup

Autoignition Temperature (°C/°F): 607.78°C/ 1126°F

Boiling point/range(°C/°F): 277-281°C/ 530.6-537.8°F

Specific gravity: 1.272

Evaporation rate: No information available

Odor threshold (ppm): No information available

Miscibility: No information available

Solubility: Easily soluble in cold water

Flashpoint (°C): 127.22°C

pH: 5.2

Molecular/Formula weight: 110.11

Viscosity: No information available

Odor: Characteristic.

Miscibility: No information available

Flashpoint (°C/°F): 127.2°C/ 261°F

10. STABILITY AND REACTIVITY

Reactivity
Reactive with strong oxidizing agents
Explosive with Nitric Acid
Reactive with acetanilide, albumin, alkalies, antipyrine, camphor, ferri salts, menthol, spirit nitrous ether, urethane, periodate
Reacts with bases

Chemical stability

Possibility of Hazardous Reactions: Hazardous polymerization does not occur

Conditions to avoid:

Incompatible Materials:

Hazardous decomposition products: Carbon oxides.

Other Information

Product code: R1005
Product name: RESORCINOL, CRYSTALLINE POWDER, USP
11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Principal Routes of Exposure:
Skin. Eyes. Ingestion. Inhalation.

Acute Toxicity

Component Information

Resorcinol - 108-46-3

<table>
<thead>
<tr>
<th>Route</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50/oral/rat</td>
<td>202 mg/kg Oral LD50 Rat</td>
</tr>
<tr>
<td>LD50/oral/mouse</td>
<td>200 mg/kg</td>
</tr>
<tr>
<td>LD50/dermal/rat</td>
<td>No information available</td>
</tr>
<tr>
<td>LD50/dermal/rabbit</td>
<td>3360 mg/kg Dermal LD50 Rabbit</td>
</tr>
<tr>
<td>LC50/inhalation/rat</td>
<td>21.3 mg/L Inhalation LC50 Rat 1 h</td>
</tr>
<tr>
<td>LC50/inhalation/mouse</td>
<td>No information available</td>
</tr>
<tr>
<td>LD50/dermal/rabbit</td>
<td>No information available</td>
</tr>
</tbody>
</table>

Product Information

LD50/oral/rat = VALUE- Acute Tox Oral = 202mg/kg

LD50/oral/mouse = VALUE - Acute Tox Oral = 200mg/kg

LD50/dermal/rabbit = VALUE-Acute Tox Dermal = 3360mg/kg

LD50/dermal/rat = VALUE - Acute Tox Dermal = No information available

LC50/inhalation/rat = VALUE-Vapor = No information available
LC50/inhalation/mouse = VALUE - Gas = No information available
LC50/inhalation/mouse = VALUE - Dust/Mist = 21.3mg/l

Symptoms

Skin Contact: Causes skin irritation.
Eye Contact: Causes serious eye irritation.
Inhalation: Causes respiratory tract and mucous membrane irritation.

Product code: R1005  Product name: RESORCINOL, CRYSTALLINE POWDER, USP
Ingestion

Toxic if swallowed. May cause digestive (gastointestinal) tract irritation. It may affect the blood (methemoglobinemia-carboxyhemoglobin), respiration (cyanosis, dyspnea), behavior/central nervous system (convulsions, excitement, tetany, coma), cardiovascular system (hypotension), liver, and kidneys. May cause methemoglobinemia, (the formation of methemoglobin in the blood which causes deficient oxygenation of the blood due to decreased available hemoglobin). Signs and symptoms of methemoglobinemia include shortness of breath, cyanosis (a bluish discoloration of the mucous membranes and unpigmented areas of the body), mental status changes such as headache, mental impairment, fatigue, muscular weakness, exercise intolerance, lightheadness, dizziness, incoordination, seizures, and loss of consciousness. Arterial blood with elevated methemoglobin levels has a characteristic chocolate-brown color as compared to normal bright red oxygen containing arterial blood. Severe methemoglobinemia is characterized by bradycardia or tachydardia (slow or fast heart beat), dysrhythmias, seizures, coma and death.

Aspiration hazard

No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Chronic Toxicity

Skin: Prolonged or repeated skin contact may cause dermatitis, an allergic skin reaction
Ingestion: Prolonged or repeated ingestion may affect the endocrine system (adrenal gland, thymus, thyroid, (thyroid hypofunction, goiter)), liver, kidneys, and metabolism (weight loss).

Sensitization:

No information available

Mutagenic Effects:

May affect genetic material
Mutations in microorganisms
Experiments with bacteria and/or yeast have shown mutagenic effects

Carcinogenic effects:

Not classifiable as a human carcinogen.

<table>
<thead>
<tr>
<th>Components</th>
<th>ACGIH - Carcinogens</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA HCS - Carcinogens</th>
<th>Australia - Prohibited Carcinogenic Substances</th>
<th>Australia - Notifiable Carcinogenic Substances</th>
</tr>
</thead>
</table>

ACGIH (American Conference of Governmental Industrial Hygienists)
IARC (International Agency for Research on Cancer)
Group 3 - Not classifiable as to its carcinogenicity to humans

Reproductive toxicity

No data is available

Reproductive Effects: No information available
Developmental Effects: No information available
Teratogenic Effects: No information available

Specific Target Organ Toxicity

STOT - single exposure No information available

Product code: R1005 Product name: RESORCINOL, CRYSTALLINE POWDER, USP
STOT - repeated exposure
Causes damage to organs through prolonged or repeated exposure.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity effects: Toxic to aquatic organisms.

Resorcinol - 108-46-3
Freshwater Fish Species Data: 36 - 100 mg/L LC50 Pimephales promelas 96 h static 1
100 mg/L LC50 Pimephales promelas 96 h flow-through 1
53.4 mg/L LC50 Pimephales promelas 96 h 1
100 mg/L LC50 Oncorhynchus mykiss 96 h flow-through 1
Water Flea Data: 78 mg/L LC50 Daphnia magna 48 h
Persistance and degradability: No information available
Bioaccumulative potential: No information available
Mobility: No information available

13. DISPOSAL CONSIDERATIONS

Disposal Methods

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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Resorcinol</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>U201</td>
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</table>

14. TRANSPORT INFORMATION

DOT
UN-No: UN2876
Proper Shipping Name: Resorcinol
Hazard Class: 6.1
Subsidiary Risk: Marine Pollutant
Packing Group: III
ERG No: 153
Marine Pollutant Risk: No data available
DOT RQ (lbs): No information available
Symbol(s): R5

TDG (Canada)
UN-No: UN2876
Product code: R1005
Product name: RESORCINOL, CRYSTALLINE POWDER, USP
14. TRANSPORT INFORMATION

<table>
<thead>
<tr>
<th>Proper Shipping Name:</th>
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<tbody>
<tr>
<td>Hazard Class:</td>
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<td>Packing Group:</td>
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**ADR**

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<td>Resorcinol</td>
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<td>Packing Group:</td>
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**IMO / IMDG**

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<th>UN2876</th>
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<td>Marine Pollutant</td>
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<td>F-A</td>
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<td>MFAG:</td>
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<td>Maximum Quantity:</td>
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**RID**

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<th>UN2876</th>
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<td>6.1</td>
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<td>Subsidiary Risk:</td>
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<td>Packing Group:</td>
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**ICAO**

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**IATA**

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<td>Proper Shipping Name:</td>
<td>Resorcinol</td>
</tr>
<tr>
<td>Hazard Class:</td>
<td>6.1</td>
</tr>
<tr>
<td>Subsidiary Risk:</td>
<td>No information available</td>
</tr>
<tr>
<td>Packing Group:</td>
<td>III</td>
</tr>
<tr>
<td>ERG Code:</td>
<td>6L</td>
</tr>
<tr>
<td>Description:</td>
<td>No information available</td>
</tr>
</tbody>
</table>
15. REGULATORY INFORMATION

International Inventories

<table>
<thead>
<tr>
<th>Components</th>
<th>U.S. TSCA</th>
<th>KOREA KECL</th>
<th>Philippines (PICCS)</th>
<th>Japan ENCS</th>
<th>CHINA</th>
<th>Australia (AICS)</th>
<th>EINECS-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resorcinol</td>
<td>Present</td>
<td>Present KE-02557</td>
<td>Present</td>
<td>Present (5)-5000</td>
<td>Present</td>
<td>Present</td>
<td>Present 203-585-2</td>
</tr>
</tbody>
</table>

U.S. Regulations

Resorcinol

- Massachusetts RTK: Present
- New Jersey RTK Hazardous Substance List: 1634
- New Jersey - Discharge Prevention - List of Hazardous Substances: Present
- Pennsylvania RTK: Environmental hazard
- Pennsylvania RTK - Environmental Hazard List Present
- New York Release Reporting - List of Hazardous Substances:
  - 5000 lb RQ
  - 1 lb RQ
- Louisiana Reportable Quantity List for Pollutants: 5000lbfinal RQ
  - 2270kgfinal RQ
- California Directors List of Hazardous Substances: Present

FDA - 21 CFR - Total Food Additives 177.1210


- 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)

- Chemicals Known to the State of California to Cause Reproductive Toxicity:
  This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

<table>
<thead>
<tr>
<th>Components</th>
<th>Carcinogen</th>
<th>Developmental Toxicity</th>
<th>Male Reproductive Toxicity</th>
<th>Female Reproductive Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resorcinol</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

CERCLA/SARA

<table>
<thead>
<tr>
<th>Components</th>
<th>CERCLA - Hazardous Substances and their Reportable Quantities</th>
<th>Section 302 Extremely Hazardous Substances and TPQs</th>
<th>Section 302 Extremely Hazardous Substances and RQs</th>
<th>Section 313 - Chemical Category</th>
<th>Section 313 - Reporting de minimis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resorcinol</td>
<td>5000 lb final RQ 2270 kg final RQ</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

U.S. TSCA

<table>
<thead>
<tr>
<th>Components</th>
<th>TSCA Section 5(a)2 - Chemicals With Significant New Use Rules (SNURS)</th>
<th>TSCA 8(d) - Health and Safety Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resorcinol</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

Canada

WHMIS hazard class:
- D1B Toxic materials
- D2B Toxic materials

Resorcinol
- D1B D2B

Product code: R1005  Product name: RESORCINOL, CRYSTALLINE POWDER, USP
Resorcinol

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.

<table>
<thead>
<tr>
<th>Components</th>
<th>WHMIS Ingredient Disclosure List -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resorcinol</td>
<td>1 %</td>
</tr>
</tbody>
</table>

Inventory

<table>
<thead>
<tr>
<th>Components</th>
<th>Canada (DSL)</th>
<th>Canada (NDSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resorcinol</td>
<td>Present</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Components</th>
<th>CEPA Schedule I - Toxic Substances</th>
<th>CEPA - 2010 Greenhouse Gases Subject to Mandatory Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resorcinol</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

EU Classification

**R-phrase(s)**
R25 - Toxic if swallowed.
R50 - Very toxic to aquatic organisms.
R36/38 - Irritating to eyes and skin.

**S -phrase(s)**
S2 - Keep out of the reach of children.
S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S61 - Avoid release to the environment. Refer to special instructions/safety data sheets.

<table>
<thead>
<tr>
<th>Components</th>
<th>Classification</th>
<th>Concentration Limits:</th>
<th>Safety Phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resorcinol</td>
<td>Xn; R22</td>
<td>No information</td>
<td>S2 S26 S61</td>
</tr>
</tbody>
</table>
<pre><code>                   | Xi; R36/38      |                        |                |
                   | N; R50          |                        |                |
</code></pre>

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

**Indication of danger:**
Xn - Harmful.
Xi - Irritant.
N - Dangerous for the environment.

Product code: R1005  
Product name: RESORCINOL, CRYSTALLINE POWDER, USP
Preparation Date: 06/10/2015
Revision Date: 06/10/2015
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
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,

Alan Wang, MSQA, ASQ CQA
Senior Manager, Global Supplier Quality Assurance
qualityassurance@spectrumchemical.com
Manufacturing Process Flowchart

Resorcinol, Crystalline Powder, USP - R1005

Benzene

Acid → Sulfonation → Neutralization

Distillation & Flaking

Acidification & Extraction → Fusion → Caustic

Packaging
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.
Certificate of Registration

Intertek Certification Limited

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

**Authorised Signature:** Calin Moldovean – President, Business Assurance
Intertek Certification Limited, 10A Victory Park, Victory Road, Derby DE24 8ZF, United Kingdom

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](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: 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
April 13, 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.

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Product Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1005</td>
<td>Resorcinol, Crystalline Powder, USP</td>
</tr>
</tbody>
</table>

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
April 18, 2016

Re: Resorcinol, Crystalline Powder, USP-R1005

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 Resorcinol, Crystalline Powder, USP-R1005 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
April 18, 2016

Re: Resorcinol, Crystalline Powder, USP-R1005

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 and milk products, Egg and egg products, Fish, Crustaceans, Shellfish, Tree Nuts, Wheat, Peanut, Soy and soybean-based products, Mustard, Sulfites, Animal and animal by-products, Barley, Monosodium Glutamate (MSG), Oats and Seeds).

Resorcinol, Crystalline Powder, USP-R1005

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
April 18, 2016

Re: Resorcinol, Crystalline Powder, USP- R1005

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. While the Manufacturing site does not specifically test for Aflatoxins, Aflatoxins are not expected to be present in material.

Resorcinol, Crystalline Powder, USP- R1005

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.

**Resorcinol**
(Benzene-1,3-diol; m-Dihydroxybenzene)
Crystalline Powder
U.S.P.
CAS 108-46-3

**Chemical Information**

- **Empirical Formula, Formula Weight and Technical Specifications Panel**
- **Size/Quantity**
- **Chemical Abstracts Service (CAS) Registry Number**
- **Caution Information**
- **DOT Shipping Information**
- **Toll-Free 24-Hour Chemical Emergency Telephone Number**
- **Assay (Dried Basis) .................. 99.0-100.5%**
- **Melting Range .................. 109°-111°C**
- **Loss on Drying .................. 1.0%**
- **Residue on Ignition .................. 0.05%**
- **Phenol .................. To pass test**
- **Catechol .................. To pass test**
- **Ordinary Impurities .................. 1.0%**
- **Residual Solvents .................. To pass test**

**DANGER**
- Toxic if swallowed
- Causes serious eye damage
- Causes skin irritation
- Causes damage to organs through prolonged or repeated exposure
- May be harmful in contact with skin.
- Do not eat, drink or smoke when using this product.
- Do not breathe dust.
- Wear protective gloves, eye protection, face protection.
- Wash face, hands and any exposed skin thoroughly after handling.

**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: Wash with plenty of water. Take off contaminated clothing and wash it before reuse. IF SKIN IRRITATION occurs: Get medical attention. IF SWALLOWED: Rinse mouth.

**KEEPS CHILDREN**

**LIGHT SENSITIVE, HYGROSCOPIC:** Keep tightly closed in light-resistant containers.

**Storage Color Band**
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.
# Certificate Of Analysis

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Lot Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1005</td>
<td>1EF0332</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>CAS Number</th>
<th>Molecular Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resorcinol, Crystalline Powder, USP</td>
<td>108-46-3</td>
<td>C₆H₆O₂</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test</th>
<th>Specification</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASSAY</strong> [C₆H₄(OH)₂]</td>
<td>99.0 - 100.5 %</td>
<td>99.8 %</td>
</tr>
<tr>
<td><strong>MELTING RANGE</strong></td>
<td>109 - 111 C</td>
<td>109 - 111 C</td>
</tr>
<tr>
<td><strong>LOSS ON DRYING</strong></td>
<td>1.0 %</td>
<td>0.0 %</td>
</tr>
<tr>
<td><strong>RESIDUE ON IGNITION</strong></td>
<td>0.05 %</td>
<td>0.00 %</td>
</tr>
<tr>
<td><strong>ORDINARY IMPURITIES</strong></td>
<td>1.0 %</td>
<td>&lt;1.0 %</td>
</tr>
<tr>
<td><strong>PHENOLS</strong></td>
<td>TO PASS TEST</td>
<td>PASSES TEST</td>
</tr>
<tr>
<td><strong>CATECHOL</strong></td>
<td>TO PASS TEST</td>
<td>PASSES TEST</td>
</tr>
<tr>
<td><strong>IDENTIFICATION</strong></td>
<td>TO PASS TEST</td>
<td>PASSES TEST</td>
</tr>
<tr>
<td><strong>RETEST DATE</strong></td>
<td>01-NOV-2019</td>
<td></td>
</tr>
<tr>
<td><strong>RESIDUAL SOLVENTS</strong></td>
<td>TO PASS TEST</td>
<td>NO RESIDUAL SOLVENTS USED</td>
</tr>
<tr>
<td><strong>APPEARANCE</strong></td>
<td></td>
<td>WHITE CRYSTALLINE POWDER</td>
</tr>
<tr>
<td><strong>MANUFACTURE DATE</strong></td>
<td></td>
<td>01-NOV-2014</td>
</tr>
</tbody>
</table>

All pharmaceutical ingredients are tested using current edition of applicable pharmacopeia.
## Certificate Of Analysis

<table>
<thead>
<tr>
<th>Item Number</th>
<th>R1005</th>
<th>Lot Number</th>
<th>2EH0201</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Resorcinol, Crystalline Powder, USP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAS Number</td>
<td>108-46-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molecular Formula</td>
<td>( \text{C}_6\text{H}_6\text{O}_2 )</td>
<td>Molecular Weight</td>
<td>110.11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test</th>
<th>Specification</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASSAY</strong> ( [\text{C}_6\text{H}_4(\text{OH})_2] )</td>
<td>99.0 - 100.5 %</td>
<td>99.5 %</td>
</tr>
<tr>
<td><strong>MELTING RANGE</strong></td>
<td>109 - 111 C</td>
<td>109 - 111 C</td>
</tr>
<tr>
<td><strong>LOSS ON DRYING</strong></td>
<td>1.0 %</td>
<td>0.0 %</td>
</tr>
<tr>
<td><strong>RESIDUE ON IGNITION</strong></td>
<td>0.05 %</td>
<td>0.000 %</td>
</tr>
<tr>
<td><strong>ORDINARY IMPURITIES</strong></td>
<td>1.0 %</td>
<td>&lt;1.0 %</td>
</tr>
<tr>
<td><strong>PHENOLS</strong></td>
<td>TO PASS TEST</td>
<td>PASSES TEST</td>
</tr>
<tr>
<td><strong>CATECHOL</strong></td>
<td>TO PASS TEST</td>
<td>PASSES TEST</td>
</tr>
<tr>
<td><strong>IDENTIFICATION</strong></td>
<td>TO PASS TEST</td>
<td>PASSES TEST</td>
</tr>
<tr>
<td><strong>RETEST DATE</strong></td>
<td></td>
<td>22-APR-2020</td>
</tr>
<tr>
<td><strong>RESIDUAL SOLVENTS</strong></td>
<td>TO PASS TEST</td>
<td>NO RESIDUAL SOLVENTS USED</td>
</tr>
<tr>
<td><strong>APPEARANCE</strong></td>
<td></td>
<td>WHITE POWDER</td>
</tr>
<tr>
<td><strong>DATE OF MANUFACTURE</strong></td>
<td></td>
<td>22-APR-2015</td>
</tr>
</tbody>
</table>

Spectrum Chemical Mfg Corp  
755 Jersey Avenue  
New Brunswick 08901 NJ

Certificate of Analysis Results Certified By:  
Mulbah F. Dywanah  
Laboratory Supervisor  
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: R1005, Resorcinol, Crystalline Powder, USP

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

The product, R1005, Resorcinol, Crystalline Powder, USP, is assigned a 60 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

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