1. IDENTIFICATION
Product Description: COUMARIN NATURAL
CAS #: 91-64-5
Other means of identification
Vigon Item #: 504022
Recommended use: Concentrated aromatic ingredient which may be used fragrance compounds according to legal and IFRA guidelines.
Recommended restrictions: For Manufacturing Use Only

2. HAZARD(S) IDENTIFICATION
Physical hazards
Health hazards
- Acute toxicity, oral Category 3
- Skin corrosion/irritation Category 2
- Serious eye damage/eye irritation Category 2A
- Sensitization, skin Category 1
- Specific target organ toxicity, single exposure Category 3 respiratory tract irritation
- Specific target organ toxicity, repeated exposure Category 2 (kidney, liver)

Environmental hazards
- Hazardous to the aquatic environment, acute hazard Category 3
- Hazardous to the aquatic environment, long-term hazard Category 3

Label elements
- Signal word: Danger
- Hazard statement:
  - H301: Toxic if swallowed.
  - H315: Causes skin irritation.
  - H317: May cause an allergic skin reaction.
  - H319: Causes serious eye irritation.
  - H335: May cause respiratory irritation.
H373 May cause damage to organs (kidney, liver) through prolonged or repeated exposure.
H402 Harmful to aquatic life.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement

Prevention
P280 Wear eye/face protection.
P264 Wash thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing should not be allowed out of the workplace.
P273 Avoid release to the environment.
P280 Wear protective gloves.

Response
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTER or doctor/physician if you feel unwell.
P321 Specific treatment (see this label).
P330 Rinse mouth.
P333 + P313 If skin irritation or rash occurs: Get medical advice/attention.
P337 + P313 If eye irritation persists: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.

Storage
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.

Disposal
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC)
None known.

Supplemental information
None.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>%</th>
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<tbody>
<tr>
<td>COUMARIN</td>
<td>COUMARINIC LACTONE</td>
<td>91-64-5</td>
<td>100</td>
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<td>COUMARINIC ANHYDRIDE</td>
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<tr>
<td></td>
<td>2H-Benzopyran-2-one</td>
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<tr>
<td></td>
<td>chromen-2-one</td>
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</table>
4. FIRST-AID MEASURES

Inhalation
If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. For breathing difficulties, oxygen may be necessary. Call a physician if symptoms develop or persist.

Skin contact
Take off immediately all contaminated clothing. Get medical attention if irritation develops and persists. Wash skin thoroughly with soap and water for several minutes.

Eye contact
Remove contact lenses, if present and easy to do. Get medical attention if irritation develops and persists. Promptly wash eyes with plenty of water while lifting the eye lids.

Ingestion
Call a physician or poison control center immediately. If swallowed, rinse mouth with water (only if the person is conscious). Do not induce vomiting. If vomiting occurs, the head should be kept low so that stomach vomit doesn’t enter the lungs.

Most important symptoms/effects, acute and delayed

Indication of immediate medical attention and special treatment needed
Not available.

General information
Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Water spray, fog, CO2, dry chemical, or alcohol resistant foam.

Unsuitable extinguishing media
Do not use a solid water stream as it may scatter and spread fire.

Specific hazards arising from the chemical
Fire may produce irritating, corrosive and/or toxic gases.

Special protective equipment and precautions for firefighters
Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Structural firefighters protective clothing will only provide limited protection. Wear self-contained breathing apparatus with a full facepiece operated in the positive pressure demand mode when fighting fires.

Fire fighting equipment/instructions
In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk. Water runoff can cause environmental damage. Ventilate closed spaces before entering them. Keep run-off water out of sewers and water sources. Dike for water control.

Specific methods
Use water spray to cool unopened containers.

General fire hazards
Static charges generated by emptying package in or near flammable vapor may cause flash fire.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Keep unnecessary personnel away. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Eliminate all sources of ignition. Avoid contact with skin or inhalation of spillage, dust or vapor.

Methods and materials for containment and cleaning up
Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Clean surface thoroughly to remove residual contamination.

Never return spills in original containers for re-use. Collect and dispose of spillage as indicated in section 13 of the SDS.
Environmental precautions: Avoid release to the environment. Contact local authorities in case of spillage to drain/aquatic environment. Prevent further leakage or spillage if safe to do so. Do not contaminate water. Retain and dispose of contaminated wash water.

7. HANDLING AND STORAGE

Precautions for safe handling: Do not handle or store near an open flame, heat or other sources of ignition. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Avoid breathing vapor. Avoid prolonged exposure. Wash thoroughly after handling. Avoid contact with eyes, skin, and clothing.

Conditions for safe storage, including any incompatibilities: Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area.

8. EXPOSURE CONTROLS/PERSOAL PROTECTION

Occupational exposure limits: No exposure limits noted for ingredient(s).

Biological limit values: No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls: Use explosion-proof ventilation equipment to stay below exposure limits.

Individual protection measures, such as personal protective equipment:

- Eye/face protection: Avoid contact with eyes. Wear safety glasses with side shields (or goggles).
- Skin protection:
  - Hand protection: Chemical resistant gloves.
  - Other: Use of an impervious apron is recommended.
- Respiratory protection: Chemical respirator with organic dust cartridge.
- Thermal hazards: Not available.

General hygiene considerations: When using, do not eat, drink or smoke. Avoid contact with eyes. Avoid contact with skin. Wash hands before breaks and immediately after handling the product. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse. Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance: Refer to Spec Sheet
- Physical state: Powder/Crystal
- Form: Crystalline powder
- Color: Refer to Spec Sheet
- Odor: Characteristic
- Odor threshold: Not available
- pH: Not available
- Melting point/freezing point: 159.8 °F (71 °C)
- Initial boiling point and boiling range: 573.8 °F (301 °C)
- Flash point: > 200.0 °F (> 93.3 °C) Closed Cup
- Evaporation rate: Not available
- Flammability (solid, gas): Not available
Upper/lower flammability or explosive limits

- Flammability limit - lower (%)
  - Not available.
- Flammability limit - upper (%)
  - Not available.
- Explosive limit - lower (%)
  - Not available.
- Explosive limit - upper (%)
  - Not available.

Vapor pressure

- 0 kPa at 25 °C
- 0.1 mm Hg at 20 °C

Vapor density

- 5.1

Relative density

- Not available.

Solubility(ies)

- Solubility (water) Insoluble

Partition coefficient (n-octanol/water)

- 1.4

Auto-ignition temperature

- Not available.

Decomposition temperature

- Not available.

Viscosity

- Not available.

Other information

- Density 0.93 g/cm3 estimated
- Molecular formula C9-H6-O2
- Molecular weight 146.14 g/mol
- Specific gravity 0.94 at 20 °C

10. STABILITY AND REACTIVITY

Reactivity

- Not available.

Chemical stability

- May form explosive peroxides.

Possibility of hazardous reactions

- Not available.

Conditions to avoid

- Not available.

Incompatible materials

- Not available.

Hazardous decomposition products

- No hazardous decomposition products if stored and handled as indicated.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

- Inhalation Irritating to respiratory system.
- Skin contact Causes skin irritation. May cause an allergic skin reaction.
- Eye contact Causes serious eye irritation.
- Ingestion Toxic if swallowed.
SAFETY DATA SHEET

504022 COUMARIN NATURAL

Revision Date: 04-12-2014
Version # 01
Page 6 of 11
Print Date: 11-28-2015

COUMARIN NATURAL (CAS 91-64-5)

Symptoms related to the physical, chemical and toxicological characteristics

Information on toxicological effects

Acute toxicity

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
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</thead>
<tbody>
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<tr>
<td><strong>Acute</strong></td>
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<tr>
<td><strong>Oral</strong></td>
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<tr>
<td>LD50</td>
<td>Guinea pig</td>
<td>202 mg/kg</td>
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<td>Mouse</td>
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<td><strong>Other</strong></td>
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<tr>
<td>LD50</td>
<td>Mouse</td>
<td>220 mg/kg</td>
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</table>

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation

Serious eye damage/eye irritation

Respiratory or skin sensitization

Respiratory sensitization

Skin sensitization

Germ cell mutagenicity

Carcinogenicity

IARC Monographs. Overall Evaluation of Carcinogenicity

COUMARIN (CAS 91-64-5) 3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity

Specific target organ toxicity - single exposure

Specific target organ toxicity - repeated exposure

Aspiration hazard

Chronic effects

Due to lack of data the classification is not possible.

Respiratory tract irritation.

May cause damage to organs (kidney, liver) through prolonged or repeated exposure.

Not applicable.

May cause damage to organs through prolonged or repeated exposure.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Harmful to aquatic life with long lasting effects. Accumulation in aquatic organisms is expected.
SAFETY DATA SHEET

504022 COUMARIN NATURAL

Revision Date: 04-12-2014
Version # 01

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
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<td>COUMARIN (CAS 91-64-5)</td>
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<tr>
<td>Aquatic Crustacea</td>
<td>LC50</td>
<td>10 - 18 mg/l, 48 hours</td>
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<tr>
<td>Aquatic Fish</td>
<td>LC50</td>
<td>32 - 100 mg/l, 96 hours</td>
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* Estimates for product may be based on additional component data not shown.

Persistence and degradability  Not available.
Bioaccumulative potential   Not available.
Partition coefficient n-octanol / water (log Kow)  1.39
Bioconcentration factor (BCF)  < 10
Specie: Leuciscus idus (Golden orfe)
Test Duration: 3 d

Mobility in soil  Not available.
Other adverse effects  Not available.

13. DISPOSAL CONSIDERATIONS

Disposal instructions  Do not discharge into drains, water courses or onto the ground. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazardous waste code  Not established.
Waste from residues / unused products  Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging  Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. TRANSPORT INFORMATION

ADN

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# SAFETY DATA SHEET
## 504022 COUMARIN NATURAL

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### DOT

#### BULK

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<td>Marine pollutant</td>
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#### NON-BULK

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15. REGULATORY INFORMATION

US federal regulations

CERCLA Hazardous Substance List (40 CFR 302.4)
Not listed.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
Not listed.

SARA 304 Emergency release notification
Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
Not listed.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
 Reactivity Hazard - No

SARA 302 Extremely hazardous substance
Not listed.

SARA 311/312 Hazardous chemical
Yes
SARA 313 (TRI reporting)
Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
Not regulated.

Safe Drinking Water Act (SDWA)
Not regulated.

Food and Drug Administration (FDA)
Barred from use in human food

US state regulations

US. Massachusetts RTK - Substance List
Not regulated.

US. New Jersey Worker and Community Right-to-Know Act
Not listed.

US. Pennsylvania Worker and Community Right-to-Know Law
Not listed.

US. Rhode Island RTK
Not regulated.

US. California Proposition 65
US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance
Not listed.

International Inventories

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<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
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<tbody>
<tr>
<td>Australia</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
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<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
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<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
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<td>China</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
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<td>Europe</td>
<td>European Inventory of Existing Commercial Chemical Substances (EINECS)</td>
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<td>Europe</td>
<td>European List of Notified Chemical Substances (ELINCS)</td>
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<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
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<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
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<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances (PICCS)</td>
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<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
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* "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).
## 16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
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<tbody>
<tr>
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<td>04-12-2014</td>
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<td>Version #</td>
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<td>HMIS® ratings</td>
<td>Health: 2*</td>
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<td>Flammability: 1</td>
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<td>Physical hazard: 0</td>
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**Disclaimer**: The information in the sheet was written based on the best knowledge and experience currently available. The above information relates only to this product and not to its use in combination with any other material or any particular process and is designed only as guidance for the safe handling, use, processing, storage, transportation, disposal, and should not be considered as a guarantee or quality specification. The above information is based on data provided by and collected from recognized sources such as distributors, manufacturers, and technical groups and is considered to be accurate to the best of Vigon’s knowledge as of the date of this document. It is the responsibility of the user to review all safety information about this product and determine its safety and suitability in their own processes and operations. Appropriate warnings and safe handling procedures should be provided to all handlers and users, taking into account the intended use and the specific conditions and factors relating to such use in accordance with all applicable laws and regulations.