SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product identifier
Trade name : N-Hance™ CG13
Cationic Guar Derivatives
™ Trademark, Ashland or its subsidiaries, registered in various countries

Relevant identified uses of the substance or mixture and uses advised against

Details of the supplier of the safety data sheet
Ashland
P.O. Box 2219
Columbus, OH  43216
United States of America (USA)
614-790-3333

EHS Customer Requests@ashland.com

Emergency telephone number
1-800-ASHLAND (1-800-274-5263)

Regulatory Information Number
1-800-325-3751

Product Information
614-790-3333

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification
Combustible Dust :

Eye irritation : Category 2A

GHS label elements
Hazard pictograms :

Signal Word : Warning

Hazard Statements : May form combustible dust concentrations in air.
Causes serious eye irritation.
Precautionary Statements

Prevention:
- Wash skin thoroughly after handling.
- Wear eye protection/ face protection.
- Keep dust/air mixtures away from ignition sources.

Response:
- IF IN EYES: Rinse cautiously with water for several minutes.
- Remove contact lenses, if present and easy to do. Continue rinsing.
- If eye irritation persists: Get medical advice/ attention.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture
Chemical nature : organic

Hazardous components

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Classification</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CATIONIC GUAR GUM, MODIFIED</td>
<td>65497-29-2</td>
<td>Eye Irrit. 2A; H319</td>
<td>90.3661</td>
</tr>
<tr>
<td>FUMARIC ACID</td>
<td>110-17-8</td>
<td>Eye Irrit. 2A; H319</td>
<td>2.30</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
- Show this safety data sheet to the doctor in attendance.
- Do not leave the victim unattended.

If inhaled : If breathed in, move person into fresh air.
- If unconscious, place in recovery position and seek medical advice.
- If symptoms persist, call a physician.

In case of skin contact : First aid is not normally required. However, it is recommended that exposed areas be cleaned by washing.
in various countries
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with soap and water.

In case of eye contact : Immediately flush eye(s) with plenty of water.
Remove contact lenses.
Protect unharmed eye.

If swallowed : Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.

Most important symptoms and effects, both acute and delayed : Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include:
- stomach or intestinal upset (nausea, vomiting, diarrhea)
- irritation (nose, throat, airways)
- Causes serious eye irritation.

Notes to physician : No hazards which require special first aid measures.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Water spray
- Foam

Unsuitable extinguishing media : High volume water jet

Specific hazards during firefighting : Organic dusts at sufficient concentration can form explosive mixtures in air.
Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous combustion products : carbon dioxide and carbon monoxide
- Hydrocarbons

Specific extinguishing methods : 
Product is compatible with standard fire-fighting agents.

Further information : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

Special protective equipment : In the event of fire, wear self-contained breathing apparatus.
SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:
- Avoid dust formation.
- Avoid breathing dust.
- Avoid contact with skin and eyes.
- Material can create slippery conditions.
- Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed.

Environmental precautions:
- Keep in suitable, closed containers for disposal.
- Prevent product from entering drains.
- Prevent further leakage or spillage if safe to do so.
- If the product contaminates rivers and lakes or drains inform respective authorities.

Methods and materials for containment and cleaning up:
- Keep in suitable, closed containers for disposal.

Other information:
- Comply with all applicable federal, state, and local regulations.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling:
- Avoid dust formation.
- Do not breathe vapours/dust.
- Do not smoke.
- Ensure all equipment is electrically grounded and bonded before beginning transfer operations.
- The material can accumulate static charge and can therefore cause electrical ignition of flammable atmospheres.
- Container hazardous when empty.
- Avoid contact with skin and eyes.
- Smoking, eating and drinking should be prohibited in the application area.
- For personal protection see section 8.
- Dispose of rinse water in accordance with local and national regulations.
- Maintain good housekeeping. Do not permit dust layers to accumulate, for example, on floors, ledges, and equipment, in order to avoid any potential for dust explosion hazards.

For further guidance on prevention of dust explosions, refer to National Fire Protection Association (NFPA) 654: "Standard for the Prevention of Fire and Dust Explosions, from the Manufacturing, Processing and Handling of Combustible
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Print Date: 2/24/2017
SDS Number: R0703481

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Version: 1.2

Particulate Solids”.

Conditions for safe storage: Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. No smoking.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

Hazardous components without workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CATIONIC GUAR GUM, MODIFIED</td>
<td>65497-29-2</td>
</tr>
<tr>
<td>FUMARIC ACID</td>
<td>110-17-8</td>
</tr>
</tbody>
</table>

Engineering measures: Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below exposure guidelines (if applicable) or below levels that cause known, suspected or apparent adverse effects. Provide appropriate exhaust ventilation at places where dust is formed.

Personal protective equipment

Hand protection
Remarks: The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Eye protection: Safety glasses

Skin and body protection: Wear as appropriate:
- Safety shoes
- Dust impervious protective suit
Choose body protection according to the amount and concentration of the dangerous substance at the work place.
- Wear resistant gloves (consult your safety equipment supplier).

Hygiene measures: Avoid breathing dust.
- Wash hands before breaks and at the end of workday.
- When using do not eat or drink.
- When using do not smoke.
### SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>powder</td>
</tr>
<tr>
<td><strong>Physical state</strong></td>
<td>solid</td>
</tr>
<tr>
<td><strong>Colour</strong></td>
<td>yellow</td>
</tr>
<tr>
<td><strong>Odour</strong></td>
<td>odourless</td>
</tr>
<tr>
<td><strong>Odour Threshold</strong></td>
<td>No data available</td>
</tr>
</tbody>
</table>
| **pH**                                | 6.0 - 7.0  
  Concentration: 1%  
  (as aqueous solution) |
| **Melting point/freezing point**      | No data available|
| **Boiling point/boiling range**       | No data available|
| **Flash point**                       | Not applicable|
| **Evaporation rate**                  | No data available|
| **Flammability (solid, gas)**         | No data available|
| **Upper explosion limit**             | No data available|
| **Lower explosion limit**             | No data available|
| **Vapour pressure**                   | No data available|
| **Relative vapour density**           | No data available|
| **Relative density**                  | No data available|
| **Density**                           | similar to water|
| **Solubility(ies)**                   |       |
| **Water solubility**                  | 100 g/l soluble, Limited by viscosity (25 °C) |
| **Solubility in other solvents**      | No data available|
| **Partition coefficient: n-octanol/water** | No data available|
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Thermal decomposition : No data available

Viscosity
  Viscosity, dynamic : No data available
  Viscosity, kinematic : No data available

Oxidizing properties : No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity : No decomposition if stored and applied as directed.

Chemical stability : Stable under recommended storage conditions.

Possibility of hazardous reactions : Dust may form explosive mixture in air.

Conditions to avoid : Keep away from heat, flame, sparks and other ignition sources.
  excessive heat
  UV light.
  Exposure to sunlight.

Incompatible materials : Acids
  Amines
  Bases
  Oxidizing agents
  reducing agents

Hazardous decomposition products : carbon dioxide and carbon monoxide
  Hydrocarbons

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Inhalation
  Skin contact
  Eye Contact
  Ingestion

Acute toxicity
Not classified based on available information.

**Components:**

**FUMARIC ACID:**
- Acute oral toxicity: LD50 (Rat, female): 9,300 mg/kg
- Acute inhalation toxicity: (Rat): > 1.3 mg/l
  - Exposure time: 4 h
  - Test atmosphere: dust/mist
  - Method: OECD Test Guideline 403
  - Assessment: Not classified as acutely toxic by inhalation under GHS.
- Acute dermal toxicity: LD50 (Rabbit): > 20,000 mg/kg

**Skin corrosion/irritation**
Not classified based on available information.

**Product:**
Remarks: May cause skin irritation in susceptible persons.

**Components:**

**CATIONIC GUAR GUM, MODIFIED:**
- Result: No skin irritation

**FUMARIC ACID:**
- Result: Slight, transient irritation

**Serious eye damage/eye irritation**
Causes serious eye irritation.

**Product:**
Remarks: Product dust may be irritating to eyes, skin and respiratory system., Causes serious eye irritation.

**Components:**

**CATIONIC GUAR GUM, MODIFIED:**
- Result: Irritating to eyes.

**FUMARIC ACID:**
- Result: Irritating to eyes.

**Respiratory or skin sensitisation**
Skin sensitisation: Not classified based on available information.
Respiratory sensitisation: Not classified based on available information.
Germ cell mutagenicity
- Not classified based on available information.

**Carcinogenicity**
- Not classified based on available information.

**Reproductive toxicity**
- Not classified based on available information.
STOT - single exposure
Not classified based on available information.

STOT - repeated exposure
Not classified based on available information.

Aspiration toxicity
Not classified based on available information.

Further information
Product:
Remarks: No data available

Carcinogenicity:
IARC
No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA
No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

NTP
No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
Product:
Ecotoxicology Assessment
Acute aquatic toxicity : Acute aquatic toxicity Category 3; Harmful to aquatic life.

Chronic aquatic toxicity : Not classified based on available information.

Components:
CATIONIC GUAR GUM, MODIFIED:
Toxicity to fish : LC50 (Cyprinus carpio (Carp)): > 100 mg/l
Exposure time: 96 h
Test Type: static test
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 54 mg/l
Exposure time: 48 h
Test Type: static test
Method: OECD Test Guideline 202
GLP: yes

Toxicity to algae : NOEC (Blue-green algae (Anabaena flos-aquae)): > 100 mg/l
Exposure time: 72 h
Test Type: Growth inhibition
Method: OECD Test Guideline 201
GLP: yes

FUMARIC ACID:
Toxicity to fish: LC50 (Danio rerio (zebra fish)): > 100 mg/l
Exposure time: 96 h
Test Type: semi-static test
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): > 100 mg/l
Exposure time: 48 h
Test Type: semi-static test
Method: OECD Test Guideline 202

Toxicity to algae: EC50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l
Exposure time: 72 h
Test Type: static test
Method: OECD Test Guideline 201

Persistence and degradability
Product:
Biodegradability: Remarks: Inherently biodegradable.

Components:
CATIONIC GUAR GUM, MODIFIED:
Biodegradability: Result: Readily biodegradable.
Biodegradation: 95 %
Exposure time: 28 d
Method: OECD Test Guideline 301D
GLP: yes
Remarks: Information given is based on data obtained from similar substances.

FUMARIC ACID:
Biodegradability: Result: Readily biodegradable.
Biodegradation: 67.5 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

No data available
Bioaccumulative potential
Components:
FUMARIC ACID:
Partition coefficient: n-octanol/water: log Pow: 0.46
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No data available

Mobility in soil

Components:
No data available

Other adverse effects
No data available

Product:
Additional ecological information
: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal., Harmful to aquatic life.

Components:

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

General advice
: The product should not be allowed to enter drains, water courses or the soil.
Do not contaminate ponds, waterways or ditches with chemical or used container.
Send to a licensed waste management company.

Dispose of in accordance with all applicable local, state and federal regulations.

Contaminated packaging
: Empty remaining contents.
Dispose of as unused product.
Empty containers should be taken to an approved waste handling site for recycling or disposal.
Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

International transport regulations

REGULATION

<table>
<thead>
<tr>
<th>ID NUMBER</th>
<th>PROPER SHIPPING NAME</th>
<th>*HAZARD CLASS</th>
<th>SUBSIDIARY HAZARDS</th>
<th>PACKING GROUP</th>
<th>MARINE POLLUTANT / LTD. QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MX_DG</td>
<td>Not dangerous goods</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER

|          | Not dangerous goods |
|          |                     |
INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO
Not dangerous goods

INTERNATIONAL MARITIME DANGEROUS GOODS
Not dangerous goods

TDG_INWT_C
Not dangerous goods

TDG_RAIL_C
Not dangerous goods

TDGROAD_C
Not dangerous goods

U.S. DOT - INLAND WATERWAYS
Not dangerous goods

CFR_RAIL_C
Not dangerous goods

U.S. DOT - ROAD
Not dangerous goods

*ORM = ORM-D, CBL = COMBUSTIBLE LIQUID

Marine pollutant | no

Dangerous goods descriptions (if indicated above) may not reflect quantity, end-use or region-specific exceptions that can be applied. Consult shipping documents for descriptions that are specific to the shipment.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act
CERCLA Reportable Quantity

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Component RQ (lbs)</th>
<th>Calculated product RQ (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUMARIC ACID</td>
<td>110-17-8</td>
<td>5000</td>
<td>217391</td>
</tr>
</tbody>
</table>

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards

- Fire Hazard
- Acute Health Hazard

SARA 313

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Pennsylvania Right To Know

- CATIONIC GUAR GUM, MODIFIED: 65497-29-2
- WATER: 7732-18-5
- FUMARIC ACID: 110-17-8

New Jersey Right To Know

- CATIONIC GUAR GUM, MODIFIED: 65497-29-2
- WATER: 7732-18-5
- FUMARIC ACID: 110-17-8

California Prop 65

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

The components of this product are reported in the following inventories:

- DSL: All components of this product are on the Canadian DSL
- AICS: On the inventory, or in compliance with the inventory
- ENCS: On the inventory, or in compliance with the inventory
- KECI: On the inventory, or in compliance with the inventory
- PICCS: On the inventory, or in compliance with the inventory
- IECSC: On the inventory, or in compliance with the inventory
- TSCA: On TSCA Inventory
Inventories
AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (USA)

SECTION 16. OTHER INFORMATION

Further information
Revision Date: 11/09/2016

<table>
<thead>
<tr>
<th>NFPA: Flammability</th>
<th>HMIS III:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health:</td>
<td>Health:</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Special hazard.</td>
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</tr>
<tr>
<td>Flammability</td>
<td>FLAMMABILITY</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Instability</td>
<td>PHYSICAL HAZARD</td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

NFPA Flammable and Combustible Liquids Classification
Not applicable

Full text of H-Statements
H319 Causes serious eye irritation.

Sources of key data used to compile the Safety Data Sheet
Ashland internal data including own and sponsored test reports
The UNECE administers regional agreements implementing harmonised classification for labelling (GHS) and transport.

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the
List of abbreviations and acronyms that could be, but not necessarily are, used in this safety data sheet:

ACGIH: American Conference of Industrial Hygienists
BEI: Biological Exposure Index
CAS: Chemical Abstracts Service (Division of the American Chemical Society).
CMR: Carcinogenic, Mutagenic or Toxic for Reproduction
FG: Food grade
GHS: Globally Harmonized System of Classification and Labeling of Chemicals.
H-statement: Hazard Statement
IATA: International Air Transport Association.
IATA-DGR: Dangerous Goods Regulation by the "International Air Transport Association" (IATA).
ICAO: International Civil Aviation Organization
ICAO-TI (ICAO): Technical Instructions by the "International Civil Aviation Organization"
IMDG: International Maritime Code for Dangerous Goods
ISO: International Organization for Standardization
logPow: octanol-water partition coefficient
LCxx: Lethal Concentration, for xx percent of test population
LDxx: Lethal Dose, for xx percent of test population.
ICxx: Inhibitory Concentration for xx of a substance
Ecxx: Effective Concentration of xx
N.O.S.: Not Otherwise Specified
OECD: Organization for Economic Co-operation and Development
OEL: Occupational Exposure Limit
P-Statement: Precautionary Statement
PBT: Persistent, Bioaccumulative and Toxic
PPE: Personal Protective Equipment
STEL: Short-term exposure limit
STOT: Specific Target Organ Toxicity
TLV: Threshold Limit Value
TWA: Time-weighted average
vPvB: Very Persistent and Very Bioaccumulative
WEL: Workplace Exposure Level

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
DOT: Department of Transportation
FIFRA: Federal Insecticide, Fungicide, and Rodenticide Act
HMIRC: Hazardous Materials Information Review Commission
HMIS: Hazardous Materials Identification System
NFPA: National Fire Protection Association
NIOSH: National Institute for Occupational Safety and Health
OSHA: Occupational Safety and Health Administration
PMRA: Health Canada Pest Management Regulatory Agency
RTK: Right to Know

information is current, applicable, and suitable to their circumstances. This SDS has been prepared by Ashland's Environmental Health and Safety Department (1-800-325-3751).
<table>
<thead>
<tr>
<th>SAFETY DATA SHEET</th>
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</thead>
<tbody>
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<td>Print Date: 2/24/2017</td>
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<td>Version: 1.2</td>
</tr>
</tbody>
</table>

WHMIS: Workplace Hazardous Materials Information System