SECTION 1. IDENTIFICATION

Product name : NOROX CHAP-21

Manufacturer or supplier’s details
Company name of supplier : United Initiators, Inc.
Address : 555 Garden Street
           Elyria OH 44035
Telephone : +1-440-323-3112
Telefax : +1-440-323-2659
Emergency telephone : CHEMTREC US (24h): +1-800-424-9300
                  CHEMTREC WORLD (24h): +1-703-527-3887
E-mail address of person responsible for the SDS : cs-initiators.nafta@united-in.com

Recommended use of the chemical and restrictions on use
Recommended use : polymerization initiators

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200
Flammable liquids : Category 4
Organic peroxides : Type D
Acute toxicity (Oral) : Category 4
Acute toxicity (Inhalation) : Category 3
Acute toxicity (Dermal) : Category 4
Skin corrosion : Category 1B
Serious eye damage : Category 1
Skin sensitization : Category 1
Reproductive toxicity : Category 1B
Specific target organ systemic toxicity - repeated exposure : Category 2
Acute aquatic toxicity : Category 2
Chronic aquatic toxicity : Category 2
SAFETY DATA SHEET

NOROX CHAP-21

GHS label elements
Hazard pictograms:

Signal Word: Danger

Hazard Statements:
- H227 Combustible liquid.
- H242 Heating may cause a fire.
- H302 + H312 Harmful if swallowed or in contact with skin.
- H314 Causes severe skin burns and eye damage.
- H317 May cause an allergic skin reaction.
- H331 Toxic if inhaled.
- H360 May damage fertility or the unborn child.
- H373 May cause damage to organs through prolonged or repeated exposure.
- H411 Toxic to aquatic life with long lasting effects.

Precautionary Statements:

Prevention:
- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- P220 Keep/Store away from clothing/strong acids, bases, heavy metal salts and other reducing substances/combustible materials.
- P234 Keep only in original container.
- P260 Do not breathe dust/fume/gas/mist/vapors/spray.
- P264 Wash skin 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 must not be allowed out of the workplace.
- P273 Avoid release to the environment.
- P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response:
- P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
- P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
- P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
- P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
- P305 + P351 + P338 + P310 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...
SAFETY DATA SHEET
NOROX CHAP-21

CENTER/doctor.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
P333 + P313 IF skin irritation or rash occurs: Get medical advice/attention.
P363 Wash contaminated clothing before reuse.
P370 + P378 In case of fire: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide to extinguish.
P391 Collect spillage.

Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P410 Protect from sunlight.
P411 + P235 Store at temperatures not exceeding < 100 °F/ < 38 °C. Keep cool.
P420 Store away from other materials.

Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Chemical nature : Organic Peroxide

Liquid mixture

Hazardous ingredients

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumene hydroperoxide</td>
<td>80-15-9</td>
<td>&gt;= 55 - &lt; 65</td>
</tr>
<tr>
<td>2,4-Pentanedione, peroxyde</td>
<td>37187-22-7</td>
<td>&gt;= 15 - &lt; 20</td>
</tr>
<tr>
<td>N-Methyl-2-pyrrolidone</td>
<td>872-50-4</td>
<td>&gt;= 10 - &lt; 15</td>
</tr>
<tr>
<td>Cumene</td>
<td>98-82-8</td>
<td>&gt;= 1 - &lt; 5</td>
</tr>
<tr>
<td>Benzenemethanol, alpha, alpha-dimethyl-</td>
<td>617-94-7</td>
<td>&gt;= 1 - &lt; 5</td>
</tr>
<tr>
<td>Acetylacetone</td>
<td>123-54-6</td>
<td>&gt;= 1 - &lt; 5</td>
</tr>
<tr>
<td>Acetophenone</td>
<td>98-86-2</td>
<td>&gt;= 1 - &lt; 5</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Show this material safety data sheet to the doctor in attendance.
Do not leave the victim unattended.
Symptoms of poisoning may appear several hours later.
No artificial respiration, mouth-to-mouth or mouth to nose. Use suitable instruments/apparatus.
Call a physician immediately.
If inhaled: Call a physician or poison control center immediately. If unconscious, place in recovery position and seek medical advice. Keep respiratory tract clear. Call a physician immediately. If breathed in, move person into fresh air. Contact a poison control center.

In case of skin contact: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash contaminated clothing before re-use. If on skin, rinse well with water. If on clothes, remove clothes. If symptoms persist, call a physician.

In case of eye contact: Small amounts splashed into eyes can cause irreversible tissue damage and blindness. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Continue rinsing eyes during transport to hospital. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.

If swallowed: Keep respiratory tract clear. Call a physician immediately. Rinse mouth thoroughly with water.

Most important symptoms and effects, both acute and delayed: Harmful if swallowed or in contact with skin. May cause an allergic skin reaction. Causes serious eye damage. Toxic if inhaled. May damage fertility or the unborn child. May cause damage to organs through prolonged or repeated exposure. Causes severe burns.

Protection of first-aiders: First Aid responders should pay attention to self-protection and use the recommended protective clothing.

Notes to physician: Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Water spray
Alcohol-resistant foam
Carbon dioxide (CO2)
Dry chemical

Unsuitable extinguishing media: High volume water jet
Specific hazards during fire fighting:

Contact with incompatible materials or exposure to temperatures exceeding SADT may result in a self-accelerating decomposition reaction with release of flammable vapors which may auto-ignite.

Flash back possible over considerable distance.
Vapors may form explosive mixtures with air.
The product will float on water and can be reignited on surface water.
Cool closed containers exposed to fire with water spray.

Specific extinguishing methods:

Do not use a solid water stream as it may scatter and spread fire.
Remove undamaged containers from fire area if it is safe to do so.
Use water spray to cool unopened containers.

Further information:

Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Special protective equipment for fire-fighters:

Wear self-contained breathing apparatus for firefighting if necessary.
Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:

Use personal protective equipment.
Ensure adequate ventilation.
Remove all sources of ignition.
Evacuate personnel to safe areas.
Follow safe handling advice and personal protective equipment recommendations.
Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.
Never return spills in original containers for re-use.
Treat recovered material as described in the section "Disposal considerations".

Environmental precautions:

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:

Contact with incompatible substances can cause decomposition at or below SADT.
Clear spills immediately.
Suppress (knock down) gases/vapors/mists with a water spray jet.
To clean the floor and all objects contaminated by this material, use plenty of water.
Soak up with inert absorbent material.
Isolate waste and do not reuse.
Non-sparking tools should be used.
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.

SECTION 7. HANDLING AND STORAGE

Technical measures: See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Advice on protection against fire and explosion: Keep away from heat and sources of ignition. Use only explosion-proof equipment. Keep away from combustible material.

Advice on safe handling: Do not swallow.
Do not breathe vapors/dust.
Avoid exposure - obtain special instructions before use.
Avoid contact with skin and eyes.
Avoid formation of aerosol.
Take precautionary measures against static discharges.
Never return any product to the container from which it was originally removed.
Provide sufficient air exchange and/or exhaust in work rooms.
Avoid confinement.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Smoking, eating and drinking should be prohibited in the application area.
Wash thoroughly after handling.
For personal protection see section 8.
Persons susceptible to skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.
Protect from contamination.

Conditions for safe storage: Avoid impurities (e.g. rust, dust, ash), risk of decomposition. Electrical installations / working materials must comply with the technological safety standards. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in original container. Keep containers tightly closed in a cool, well-ventilated place. Store in accordance with the particular national regulations.

Materials to avoid: Keep away from strong acids, bases, heavy metal salts and other reducing substances.

Recommended storage temperature: < 100 °F
SECTION 8. EXPOSURE CONTROLS/PERSOAL PROTECTION

Ingredients with workplace control parameters

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumene hydroperoxide</td>
<td>80-15-9</td>
<td>TWA</td>
<td>1 ppm</td>
<td>US WEEL</td>
</tr>
<tr>
<td>N-Methyl-2-pyrrolidone</td>
<td>872-50-4</td>
<td>TWA</td>
<td>10 ppm</td>
<td>US WEEL</td>
</tr>
<tr>
<td>Cumene</td>
<td>98-82-8</td>
<td>TWA</td>
<td>50 ppm</td>
<td>ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>50 ppm 245 mg/m3</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>50 ppm 245 mg/m3</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>50 ppm 245 mg/m3</td>
<td>OSHA P0</td>
</tr>
<tr>
<td>Acetylacetone</td>
<td>123-54-6</td>
<td>TWA</td>
<td>25 ppm</td>
<td>ACGIH</td>
</tr>
<tr>
<td>acetophenone</td>
<td>98-86-2</td>
<td>TWA</td>
<td>10 ppm</td>
<td>ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>10 ppm</td>
<td>US WEEL</td>
</tr>
</tbody>
</table>

Hazardous components without workplace control parameters

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,4-Pentanedione, peroxide</td>
<td>37187-22-7</td>
</tr>
<tr>
<td>Benzenemethanol, alpha, alpha-dimethyl-</td>
<td>617-94-7</td>
</tr>
</tbody>
</table>

Biological occupational exposure limits

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS-No.</th>
<th>Control parameters</th>
<th>Biological specimen</th>
<th>Sampling time</th>
<th>Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-Methyl-2-pyrrolidone</td>
<td>872-50-4</td>
<td>5-Hydroxy-N-methyl-2-pyrrolidone</td>
<td>Urine</td>
<td>End of shift (As soon as possible after exposure ceases)</td>
<td>100 mg/l</td>
<td>ACGIH BEI</td>
</tr>
</tbody>
</table>

Engineering measures

- Minimize workplace exposure concentrations.

Personal protective equipment

- Respiratory protection: In the case of dust or aerosol formation use respirator with an approved filter.
  - Filter type: ABEK-filter

- Hand protection
  - Material: butyl-rubber
  - Break through time: >= 480 min
Glove thickness : 0.5 mm

Remarks : Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove Wash hands before breaks and at the end of workday.

Eye protection : Tightly fitting safety goggles
Please wear suitable protective goggles. Also wear face protection if there is a splash hazard. Ensure that eyewash stations and safety showers are close to the workstation location.

Skin and body protection : Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential.

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

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid
Color : colorless
Odor : slight
pH : Not applicable
Melting point/range : No data available
Boiling point/boiling range : No data available
Flash point : 65 °C
Method: closed cup
Evaporation rate : No data available
Flammability (solid, gas) : Not applicable
Self-ignition :
Upper explosion limit : No data available
Lower explosion limit : No data available
Vapor pressure: No data available
Relative vapor density: > 1
Density: 1.0 g/cm³
Solubility(ies):
Water solubility: slightly soluble
Partition coefficient: n-octanol/water: No data available
Self-Accelerating decomposition temperature (SADT): 60 °C
SADT-Self Accelerating Decomposition Temperature. Lowest temperature at which the tested package size will undergo a self-accelerating decomposition reaction.

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

Oxidizing properties: The substance or mixture is not classified as oxidizing.

Organic peroxide

SECTION 10. STABILITY AND REACTIVITY

Reactivity: Stable under recommended storage conditions.
Chemical stability: Stable under recommended storage conditions.
Possibility of hazardous reactions: Vapors may form explosive mixture with air.
Conditions to avoid: Protect from contamination. Contact with incompatible substances can cause decomposition at or below SADT. Heat, flames and sparks. Avoid confinement.
Incompatible materials: Accelerators, strong acids and bases, heavy metals and heavy metal salts, reducing agents
Hazardous decomposition products: Irritant, caustic, flammable, noxious/toxic gases and vapours can develop in the case of fire and decomposition

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity
Harmful if swallowed or in contact with skin.
Toxic if inhaled.
Product:
Acute oral toxicity : Acute toxicity estimate: 592.98 mg/kg
Method: Calculation method

Acute inhalation toxicity : Acute toxicity estimate: 0.83 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: Calculation method

Acute dermal toxicity : Acute toxicity estimate: 1,715 mg/kg
Method: Calculation method

Ingredients:
Cumene hydroperoxide:
Acute oral toxicity : LD50 Oral (Rat): 382 mg/kg

Acute inhalation toxicity : 0.51 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: Expert judgment
Assessment: The component/mixture is toxic after short term inhalation.

Acute dermal toxicity : Acute toxicity estimate: 1,100 mg/kg
Method: Expert judgment

2,4-Pentanedione, peroxide:
Acute oral toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 401

Acute inhalation toxicity : LC50 (Rat, male): > 13.1 mg/l
Exposure time: 1 h
Test atmosphere: dust/mist
Method: Expert judgment
Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: Expert judgment
Assessment: The substance or mixture has no acute dermal toxicity

N-Methyl-2-pyrrolidone:
Acute oral toxicity : LD50 (Rat): 4,150 mg/kg
Method: OECD Test Guideline 401

Acute inhalation toxicity : LC50 (Rat): > 5.1 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403

Acute dermal toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 402

**Cumene:**
Acute oral toxicity : LD50 (Rat): 2,700 mg/kg
   Method: OECD Test Guideline 401
Acute dermal toxicity : LD50 (Rabbit): > 3,160 mg/kg

**Benzenemethanol, alpha,alpha-dimethyl-:**
Acute oral toxicity : LD50 (Rat): 1,300 mg/kg
Acute dermal toxicity : LD50 (Rabbit): 4,300 mg/kg

**Acetylacetone:**
Acute oral toxicity : LD50 (Rat): 570 mg/kg
Acute inhalation toxicity : LC50 (Rat): 5.1 mg/l
   Exposure time: 4 h
   Test atmosphere: vapor
   Method: OECD Test Guideline 403
   Assessment: The component/mixture is toxic after short term inhalation.
Acute dermal toxicity : LD50 (Rabbit, female): 790 mg/kg

**acetophenone:**
Acute oral toxicity : Acute toxicity estimate: 500 mg/kg
   Method: Expert judgment
   Assessment: The component/mixture is moderately toxic after single ingestion.
   Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI
Acute dermal toxicity : LD50 (Rat): 3,300 mg/kg
   Method: OECD Test Guideline 402

**Skin corrosion/irritation**
Causes severe burns.

**Product:**
Remarks: Extremely corrosive and destructive to tissue.

**Ingredients:**

**Cumene hydroperoxide:**
Species: Rabbit
Result: Causes burns.

**2,4-Pentanedione, peroxide:**
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

**N-Methyl-2-pyrrolidone:**
Species: Rabbit
Method: OECD Test Guideline 404
Result: Irritating to skin.

**Cumene:**
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

**Benzenemethanol, alpha,alpha-dimethyl-:**
Species: Rabbit
Result: Severe skin irritation

**Acetylacetone:**
Species: Rabbit
Result: No skin irritation

**acetophenone:**
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

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

**Product:**
Remarks: May cause irreversible eye damage.

**Ingredients:**

**Cumene hydroperoxide:**
Species: Rabbit
Result: Corrosive

**2,4-Pentanedione, peroxide:**
Species: Rabbit
Result: Eye irritation
Method: OECD Test Guideline 405

**N-Methyl-2-pyrrolidone:**
Species: Rabbit
Result: Eye irritation
Method: OECD Test Guideline 405
Cumene:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

Benzenemethanol, alpha,alpha-dimethyl-:
Result: Irritating to eyes.

Acetylacetone:
Species: Rabbit
Result: No eye irritation

Acetophenone:
Species: Rabbit
Result: Eye irritation
Method: No information available.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Respiratory or skin sensitization
Skin sensitization
May cause an allergic skin reaction.

Respiratory sensitization
Not classified based on available information.

Product:
Remarks: Causes sensitization.

Ingredients:
Cumene hydroperoxide:
Result: Does not cause skin sensitization.

2,4-Pentanedione, peroxide:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: Probability or evidence of skin sensitization in humans
Remarks: Causes sensitization.

N-Methyl-2-pyrrolidone:
Species: Mouse
Method: OECD Test Guideline 429
Result: Does not cause skin sensitization.
Remarks: Based on data from similar materials
Cumene:
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: Does not cause skin sensitization.

Acetylacetone:
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: Does not cause skin sensitization.

Acetophenone:
Test Type: Draize Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: Does not cause skin sensitization.

Germ cell mutagenicity
Not classified based on available information.

Ingredients:

Cumene hydroperoxide:
Genotoxicity in vitro: Result: positive
Remarks: In vitro tests have shown mutagenic effects.

Genotoxicity in vivo:
Test Type: Micronucleus test
Species: Mouse
Application Route: Skin contact
Result: negative

2,4-Pentanedione, peroxide:
Genotoxicity in vitro:
Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: positive

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Genotoxicity in vivo:
Test Type: In vivo micronucleus test
Species: Mouse (male and female)
Application Route: Intraperitoneal injection
Method: OECD Test Guideline 474
Result: negative

Cumene:
Genotoxicity in vitro: Method: OECD Test Guideline 473
Result: negative
Method: OECD Test Guideline 471
Result: negative

Method: OECD Test Guideline 476
Result: negative

Method: OECD Test Guideline 482
Result: negative

Test Type: Ames test
Result: positive

Genotoxicity in vivo:
Species: Rat
Application Route: Intraperitoneal
Exposure time: 72 h
Method: OECD Test Guideline 474
Result: Equivocal

Species: Mouse
Application Route: inhalation (gas)
Exposure time: 14 w
Method: OECD Test Guideline 474
Result: negative

Acetylacetone:
Genotoxicity in vitro:
Method: OECD Test Guideline 471
Result: negative

Method: OECD Test Guideline 479
Result: positive

Method: OECD Test Guideline 473
Result: positive

Method: OECD Test Guideline 476
Result: negative

Genotoxicity in vivo:
Method: OECD Test Guideline 474
Result: positive

Method: OECD Test Guideline 483
Result: negative

Method: OECD Test Guideline 475
Result: negative

Method: OECD Test Guideline 478
Result: Equivocal

Test Type: DNA Repair
Species: Rat
Application Route: Oral
Result: negative
Species: Rat  
Application Route: inhalation (vapor)  
Method: OPPTS 870.5395  
Result: negative

acetophenone:  
Genotoxicity in vitro:  
Method: OECD Test Guideline 473  
Result: negative


: Method: OECD Test Guideline 476  
Result: negative

: Method: OECD Test Guideline 471  
Result: negative

Genotoxicity in vivo:  
Species: Mouse  
Application Route: Intraperitoneal  
Method: OECD Test Guideline 474  
Result: negative

Carcinogenicity  
Not classified based on available information.

Ingredients:

Cumene hydroperoxide:  
Remarks: This information is not available.

2,4-Pentanedione, peroxide:  
Remarks: This information is not available.

Cumene:  
Species: Rat  
Application Route: inhalation (gas)  
Exposure time: 2 Years  
LOEC: 250  
Method: OECD Test Guideline 451  
Result: negative

Species: Mouse  
Application Route: inhalation (gas)  
Exposure time: 2 Years  
LOEC: 125  
Method: OECD Test Guideline 451  
Result: negative

Carcinogenicity - Assessment:  
Carcinogenicity classification not possible from current data.

IARC  
Group 2B: Possibly carcinogenic to humans

Cumene  
98-82-8
OSHA
No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

NTP
Reasonably anticipated to be a human carcinogen

Cumene 98-82-8

Reproductive toxicity
May damage fertility or the unborn child.

Ingredients:

Cumene hydroperoxide:
Effects on fertility : Remarks: No data available
Effects on fetal development : Remarks: No data available

2,4-Pentanedione, peroxide:
Effects on fertility : Remarks: No data available
Effects on fetal development : Remarks: No data available

N-Methyl-2-pyrrolidone:
Reproductive toxicity - Assessment : Clear evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments

Cumene:
Effects on fetal development : Species: Rabbit
Application Route: inhalation (vapor)
General Toxicity Maternal: LOAEL: 500
Developmental Toxicity: NOAEL: 2,300
Method: OECD Test Guideline 414

Species: Rat
Application Route: inhalation (vapor)
General Toxicity Maternal: NOAEL: 100
Developmental Toxicity: NOAEL: > 1,200
Method: OECD Test Guideline 414

Acetylcetone:
Effects on fetal development : Species: Rat
Application Route: inhalation (vapor)
Duration of Single Treatment: 13 d
General Toxicity Maternal: NOAEC: 200
Teratogenicity: NOAEC Parent: 400
Embryo-fetal toxicity: NOAEC F1: 50
Method: OECD Test Guideline 414

Species: Rat
Application Route: inhalation (vapor)
Duration of Single Treatment: 13 d
General Toxicity Maternal: LOAEC: 400
Embryo-fetal toxicity: LOAEC F1: 200
Method: OECD Test Guideline 414

acetophenone:
Effects on fertility: Species: Rat
Application Route: Ingestion
General Toxicity Parent: NOAEL: 225 mg/kg body weight
General Toxicity F1: NOAEL: 225 mg/kg body weight
Method: OECD Test Guideline 422
Result: negative
Species: Rat
Application Route: Ingestion
General Toxicity Parent: LOAEL: 750 mg/kg body weight
General Toxicity F1: LOAEL: 750 mg/kg body weight
Method: OECD Test Guideline 422

Effects on fetal development: Species: Mouse
Application Route: Ingestion
General Toxicity Maternal: NOAEL: >= 175 mg/kg body weight
Teratogenicity: NOAEL: >= 175 mg/kg body weight
Developmental Toxicity: NOAEL: >= 175 mg/kg body weight
Method: OECD Test Guideline 414
Result: negative

STOT-single exposure
Not classified based on available information.

Ingredients:

N-Methyl-2-pyrrolidone:
Assessment: May cause respiratory irritation.

Cumene:
Assessment: May cause respiratory irritation.

STOT-repeated exposure
May cause damage to organs through prolonged or repeated exposure.

Ingredients:

Cumene hydroperoxide:
Assessment: May cause damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Ingredients:

Cumene hydroperoxide:
Species: Rat
NOAEL: 0.031 mg/l
Application Route: inhalation (dust/mist/fume)
Exposure time: 90 d

N-Methyl-2-pyrrolidone:
Species: Rat
NOAEL: 0.5 mg/l
LOAEL: 1 mg/l
Application Route: inhalation (vapor)
Exposure time: 90 d
Method: OECD Test Guideline 413

Species: Rat
NOAEL: 3,000 mg/kg
LOAEL: 7,500 mg/kg
Application Route: Ingestion
Exposure time: 90 d
Method: OECD Test Guideline 408

Species: Rat
NOAEL: 6,000 mg/kg
LOAEL: 18,000 mg/kg
Application Route: oral (feed)
Exposure time: 28 d
Method: OECD Test Guideline 407

Species: Rabbit
NOAEL: 826 mg/kg
Application Route: Skin contact
Exposure time: 20 d
Method: OECD Test Guideline 410

Cumene:
Species: Rat
NOAEL: > 536 mg/kg
Application Route: oral (feed)

Species: Rat
NOAEL: 125 mg/kg
Application Route: inhalation (vapor)
Method: OECD Test Guideline 413

Acetylacetone:
Species: Rat
NOAEL: 200 mg/kg
LOAEL: 805 mg/kg
Application Route: inhalation (vapor)
Exposure time: 9 d

Species: Rat
NOAEL: 100 mg/kg
Application Route: inhalation (vapor)
Exposure time: 90 d
Method: OECD Test Guideline 413
Species: Rabbit
NOAEL: 244 mg/kg
LOAEL: 975 mg/kg
Application Route: Dermal
Exposure time: 9 d

acetophenone:
Species: Rat
NOAEL: 225 mg/kg
LOAEL: 750 mg/kg
Application Route: Ingestion
Method: OECD Test Guideline 422

Aspiration toxicity
Not classified based on available information.

Ingredients:
Cumene:
May be fatal if swallowed and enters airways.

2,4-Pentanedione, peroxide:
Remarks: No data available

Aspiration toxicity
Not classified based on available information.

Ingredients:
Cumene hydroperoxide:
Toxicity to fish:
- LC50 (Oncorhynchus mykiss (rainbow trout)): 3.9 mg/l
  Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates:
- EC50 (Daphnia magna (Water flea)): 18 mg/l
  Exposure time: 48 h

Toxicity to algae:
- EC50 (Desmodesmus subspicatus (green algae)): 1.6 mg/l
  Exposure time: 72 h
  Method: OECD Test Guideline 201

2,4-Pentanedione, peroxide:

Toxicity to fish:
- LC50 (Danio rerio (zebra fish)): > 67.6 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)): 7.05 mg/l
  Exposure time: 48 h
  Method: OECD Test Guideline 202

Toxicity to algae:
- EC50 (Pseudokirchneriella subcapitata (green algae)): 5.36 mg/l
  Exposure time: 72 h
  Method: OECD Test Guideline 201

Toxicity to microorganisms:
- EC50: 614 mg/l
  Exposure time: 3 h
  Method: OECD Test Guideline 209

N-Methyl-2-pyrrolidone:

Toxicity to fish:
- LC50 (Oncorhynchus mykiss (rainbow trout)): > 500 mg/l
  Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates:
- EC50 (Daphnia magna (Water flea)): > 1,000 mg/l
  Exposure time: 24 h
  Method: DIN 38412

  EC50 (Palaeomonetes vulgaris (Grass shrimp)): 1,107 mg/l
  Exposure time: 96 h

Toxicity to algae:
- EC50 (Desmodesmus subspicatus (Scenedesmus subspicatus)): > 500 mg/l
  Exposure time: 72 h
  NOEC (Desmodesmus subspicatus (green algae)): 125 mg/l
  Exposure time: 72 h

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):
- NOEC (Daphnia magna (Water flea)): 12.5 mg/l
  Exposure time: 21 d
  Method: OECD Test Guideline 211

  LOEC (Daphnia magna (Water flea)): 25 mg/l
  Exposure time: 21 d
  Method: OECD Test Guideline 211
Toxicity to microorganisms: EC50: > 600 mg/l
Exposure time: 0.5 h
Method: ISO 8192

Cumene:

Toxicity to fish: LC50 (Oncorhynchus mykiss (rainbow trout)): 4.8 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): 2.14 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae: EC50 (Desmodesmus subspicatus (green algae)): 2.01 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): NOEC (Daphnia magna (Water flea)): 0.35 mg/l
Exposure time: 21 d
Method: OECD Test Guideline 211

Toxicity to microorganisms: EC50: > 2,000 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

Ecotoxicology Assessment

Chronic aquatic toxicity: Toxic to aquatic life with long lasting effects.

Acetylacetone:

Toxicity to fish: LC50 (Pimephales promelas (fathead minnow)): 104 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): 25.9 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

NOEC (Daphnia magna (Water flea)): 4.3 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae: EC50 (Pseudokirchneriella subcapitata (green algae)): 83.22 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Pseudokirchneriella subcapitata (green algae)): 3.2 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to fish (Chronic toxicity): NOEC (Pimephales promelas (fathead minnow)): 10 mg/l
Exposure time: 34 d
Method: OECD Test Guideline 210

LOEC (Pimephales promelas (fathead minnow)): 22 mg/l
Exposure time: 34 d
Method: OECD Test Guideline 210

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):
NOEC (Daphnia magna (Water flea)): 18 mg/l
Exposure time: 21 d
Method: OECD Test Guideline 211

Toxicity to microorganisms:
EC50: 107.6 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

EC10: 13.2 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

acetophenone:

Toxicity to fish:
LC50 (Pimephales promelas (fathead minnow)): 162 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates:
EC50 (Daphnia magna (Water flea)): 528 mg/l
Exposure time: 48 h

Toxicity to algae:
EC50 (Pseudokirchneriella subcapitata (green algae)): 86.4 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Pseudokirchneriella subcapitata (green algae)): 24.8 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to microorganisms:
IC50: > 1,000 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

Persistence and degradability

Ingredients:

Cumene hydroperoxide:
Biodegradability: Result: Not readily biodegradable.
Method: OECD Test Guideline 301B

2,4-Pentanedione, peroxide:
Biodegradability: Result: Readily biodegradable.
Method: OECD Test Guideline 301D

N-Methyl-2-pyrrolidone:
Biodegradability: Result: Readily biodegradable. Method: OECD Test Guideline 301C

Cumene:
Biodegradability: Result: Readily biodegradable.

Benzenemethanol, alpha,alpha-dimethyl-:
Biodegradability: Remarks: No data available

Acetylacetone:
Biodegradability: Result: Readily biodegradable. Method: OECD Test Guideline 301C

acetophenone:
Biodegradability: Result: Readily biodegradable. Method: OECD Test Guideline 301C

Bioaccumulative potential

Ingredients:

Cumene hydroperoxide:
Partition coefficient: n-octanol/water: log Pow: 1.6

2,4-Pentanedione, peroxide:

N-Methyl-2-pyrrolidone:
Partition coefficient: n-octanol/water: log Pow: -0.46 (25 °C)

Cumene:
Bioaccumulation: Bioconcentration factor (BCF): 94.69 Remarks: Calculation

Partition coefficient: n-octanol/water: log Pow: 3.55 (23 °C)

Benzenemethanol, alpha,alpha-dimethyl-:
Partition coefficient: n-octanol/water: Remarks: No data available

Acetylacetone:
Bioaccumulation: Bioconcentration factor (BCF): 3.16 Remarks: Calculation
Partition coefficient: n-octanol/water: log Pow: 0.68 (40 °C)

acetophenone:
Bioaccumulation: Bioconcentration factor (BCF): 0.48
Partition coefficient: n-octanol/water: log Pow: 1.63

Mobility in soil
No data available

Other adverse effects

Product:
Ozone-Depletion Potential: Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

Additional ecological information: No data available

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Toxic to aquatic life with long lasting effects.

Ingredients:

2,4-Pentanedione, peroxide:
Additional ecological information: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Toxic to aquatic life.

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

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues: 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. Dispose of wastes in an approved waste disposal facility.

Contaminated packaging: Empty remaining contents.
Dispose of as unused product.  
Do not re-use empty containers. 
Do not burn, or use a cutting torch on, the empty drum.  
Dispose of in accordance with local regulations.

**SECTION 14. TRANSPORT INFORMATION**

**International Regulations**

**UNRTDG**  
UN number : UN 3105  
Proper shipping name : ORGANIC PEROXIDE TYPE D, LIQUID  
(CUMYL HYDROPEROXIDE, ACETYL ACETONE PEROXIDE)  
Class : 5.2  
Packing group : Not assigned by regulation  
Labels : 5.2

**IATA-DGR**  
UN/ID No. : UN 3105  
Proper shipping name : Organic peroxide type D, liquid  
(Cumyl hydroperoxide, Acetyl acetone peroxide)  
Class : 5.2  
Packing group : Not assigned by regulation  
Labels : Organic Peroxides, Keep Away From Heat  
Packing instruction (cargo aircraft) : 570  
Packing instruction (passenger aircraft) : 570

**IMDG-Code**  
UN number : UN 3105  
Proper shipping name : ORGANIC PEROXIDE TYPE D, LIQUID  
(CUMYL HYDROPEROXIDE, ACETYL ACETONE PEROXIDE)  
Class : 5.2  
Packing group : Not assigned by regulation  
Labels : 5.2  
EmS Code : F-J, S-R  
Marine pollutant : yes

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**  
Not applicable for product as supplied.

**Domestic regulation**

**49 CFR**  
UN/ID/NA number : UN 3105  
Proper shipping name : Organic peroxide type D, liquid  
(Acetyl Acetone Peroxide, <=18%, Cumyl Hydroperoxide, <=61%)  
Class : 5.2  
Packing group : Not assigned by regulation  
Labels : ORGANIC PEROXIDE  
ERG Code : 145  
Marine pollutant : yes
SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity

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<th>Ingredients</th>
<th>CAS-No.</th>
<th>Component RQ (lbs)</th>
<th>Calculated product RQ (lbs)</th>
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<td>Cumene hydroperoxide</td>
<td>80-15-9</td>
<td>10</td>
<td>18</td>
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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
- Reactivity Hazard
- Acute Health Hazard
- Chronic Health Hazard

SARA 302:

- No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313:

- The following components are subject to reporting levels established by SARA Title III, Section 313:
  - Cumene hydroperoxide 80-15-9
  - Cumene 98-82-8
  - Acetophenone 98-86-2
  - N-Methyl-2-pyrrolidone 872-50-4

Clean Air Act

This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 12 (40 CFR 61):
  - Cumene 98-82-8
  - Acetophenone 98-86-2

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489):
  - Cumene hydroperoxide 80-15-9
  - Cumene 98-82-8
  - Acetophenone 98-86-2

Clean Water Act

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.

This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307.

California Prop. 65

WARNING! This product contains a chemical known in the State of California to cause cancer.

- Cumene 98-82-8
WARNING: This product contains a chemical known in the State of California to cause birth defects or other reproductive harm.

N-Methyl-2-pyrrolidone 872-50-4

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

- DSL (CA): All components of this product are on the Canadian DSL
- AICS (AU): On the inventory, or in compliance with the inventory
- NZIoC (NZ): On the inventory, or in compliance with the inventory
- ENCS (JP): On the inventory, or in compliance with the inventory
- ISHL (JP): On the inventory, or in compliance with the inventory
- KECl (KR): On the inventory, or in compliance with the inventory
- PICCS (PH): On the inventory, or in compliance with the inventory
- IECSC (CN): On the inventory, or in compliance with the inventory
- TCSI (TW): On the inventory, or in compliance with the inventory
- TSCA (US): On TSCA Inventory

TSCA list
No substances are subject to a Significant New Use Rule.

The following substance(s) is/are subject to TSCA 12(b) export notification requirements:

Acetylacetone 123-54-6

SECTION 16. OTHER INFORMATION

Full text of other abbreviations
AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECS - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECl - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Pre-
SAFETY DATA SHEET

NOROX CHAP-21

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<th>Revision Date:</th>
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<th>Print Date:</th>
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<td>600000000159</td>
<td>05/02/2018</td>
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Revision Date: 04/30/2018

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

US / Z8