MATERIAL SAFETY DATA SHEET

IONOL LC

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

Product name: Ionol LC
Intended Use: Antioxidant
Supplier: Castle Chemicals Ltd, Peak House
6 Oxford Road, Altrincham, Cheshire WA14 2DY
Tel: +44 161 608 8800 Fax: +44 161 608 1910
Email: info@castlechemicals.com

2. HAZARD IDENTIFICATION

Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008 Aquatic Chronic 4 H413 May cause long lasting harmful effects to aquatic life.


Labelling according to Regulation (EC) No 1272/2008 The substance is classified and labelled according to the CLP regulation.

Hazard pictograms Void
Signal word Void
Hazard statements H413 May cause long lasting harmful effects to aquatic life.
Precautionary statements P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P273 Avoid release to the environment.
P281 Use personal protective equipment as required.
P220 Keep away from alkaline solutions.
P220 Keep away from oxidising agents and acidic substances.
P309 IF exposed or if you feel unwell:
P314 Get medical advice/attention if you feel unwell.
P391 Collect spillage.
3. COMPOSITION INFORMATION ON INGREDIENTS

Chemical characterization | Substances
--- | ---
CAS No. Description | 68610-51-5 Butylated reaction product of p-cresol and dicyclopentadiene
Identification number(s) | EINECS Number - 271-867-2

4. FIRST AID MEASURES

General information | Personal protection for the First Aider.
Immediately remove any clothing soiled by the product.
Take affected persons out of danger area and lay down.
Position and transport stably in side position.
Artificial respiration with respiration bag or respirator

After inhalation | Take affected persons into fresh air and keep quiet.
Seek medical treatment in case of complaints.

After skin contact | Immediately wash with water and soap and rinse thoroughly. If skin irritation continues, consult a doctor.

After eye contact | Rinse opened eye for several minutes under running water. In case of irritation consult an oculist.

After swallowing | Rinse out mouth and then drink plenty of water.
Induce vomiting only, if affected person is fully conscious.
Vomiting, possible danger of aspiration, keep breathing passages free Seek medical treatment.

Information for doctor | If indication of any immediate medical attention and special treatment needed treat symptomatically

5. FIREFIGHTING MEASURES

Suitable extinguishing agents | CO2, powder or water spray. Fight larger fire with alcohol resistant foam.
Special hazards arising from the substance or mixture | Carbon monoxide and carbon dioxide, not combusted
Hydrocarbons. Danger of forming toxic pyrolysis products.
Advice for firefighters | Wear fully protective suit. Do not inhale explosion gases or combustion gases. Wear self-contained respiratory protective device.
Protective equipment | Additional information | Collect contaminated fire fighting water separately. It must not enter the sewage system.
6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Use respiratory protective device against the effects of fumes/dust/aerosol. Wear protective equipment. Keep unprotected persons away. Keep away from ignition sources.

Environmental precautions
Damp down dust with water spray. Do not allow to enter sewers/surface or ground water.

Methods and material for containment and cleaning up
Pick up mechanically. Dispose contaminated material as waste according to item 13. Ensure adequate ventilation.

Reference to other sections
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7. HANDLING AND STORAGE

Handling
Precautions for safe handling
Ensure good ventilation/exhaustion at the workplace. Development and deposition of dust has to be avoided.

Information about fire - and explosion protection
Keep ignition sources away - Do not smoke. Protect against electrostatic charges. Dust can combine with air to form an explosive mixture.

Requirements to be met by storerooms and receptacles
Store only in the original receptacle.

Information about storage in one common storage facility
Heating in presence of strong mineral acids will liberate Isobutylene.

Further information about storage conditions
Store in cool, dry conditions in well sealed receptacles. Store receptacle in a well ventilated area. Protect from humidity and water.

Recommended storage temperature
At 15 °C to 25 °C

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
Ingredients with limit values that require monitoring at the workplace
Not required.

Additional information
The lists valid during the making were used as basis.

Personal protective equipment:
General protective and hygienic measures
Do not inhale gases / fumes / aerosols / dust. Immediately remove all soiled and contaminated clothing. Avoid contact with the eyes and skin.

Respiratory protection
Use suitable respiratory protective device in case of
insufficient ventilation. In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.

Recommended filter device for short term use: Filter FFP2
Protection of hands: Protective gloves
Material of gloves: Nitrile rubber, NBR
Recommended material strength: ≥ 0.11 mm
Penetration time of glove material: Penetration time ≥ 8 h
The exact breakthrough time has to be found out by the manufacturer of the protective gloves and has to be observed.

Not suitable are gloves made of the following materials:
- Leather gloves
- Strong material gloves

Eye protection:
- Safety glasses

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Flakes, Powder</td>
</tr>
<tr>
<td>Form</td>
<td>Flakes, Powder</td>
</tr>
<tr>
<td>Colour</td>
<td>Light beige</td>
</tr>
<tr>
<td>Odour</td>
<td>Odourless</td>
</tr>
<tr>
<td>pH-value (111 g/l) at 20°C</td>
<td>~ 7 - 8</td>
</tr>
<tr>
<td>Change in condition</td>
<td></td>
</tr>
<tr>
<td>Melting point/Melting range</td>
<td>~ 105-120°C</td>
</tr>
<tr>
<td>Boiling point/Boiling range</td>
<td>n.d. °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>n.a. °C</td>
</tr>
<tr>
<td>Ignition temperature</td>
<td>380°C (BAM Germany)</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>≥ 300°C (T-onset, DSC)</td>
</tr>
<tr>
<td>Vapour pressure at 20°C</td>
<td>&lt; 0.00000024 mm Hg (US-EPA-HPV-Report)</td>
</tr>
<tr>
<td>Density at 20°C</td>
<td>~ 1.1 g/cm³</td>
</tr>
<tr>
<td>Bulk density at 20°C</td>
<td>~ 300-400 kg/m³</td>
</tr>
<tr>
<td>Solubility in / Miscibility with water</td>
<td>≤ 0.0002 g/l</td>
</tr>
<tr>
<td>at 20°C</td>
<td></td>
</tr>
<tr>
<td>Other information</td>
<td></td>
</tr>
<tr>
<td>VOC European Union %</td>
<td>0 %</td>
</tr>
<tr>
<td>VOC Swiss</td>
<td>0 % VOCV 08.10.02</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical stability</td>
<td></td>
</tr>
<tr>
<td>Thermal decomposition / conditions to be avoided</td>
<td>No decomposition if used according to specifications.</td>
</tr>
<tr>
<td>Possibility of hazardous reactions</td>
<td>Risk of dust explosion. Reacts with strong acids, alkalines and oxidizing agents.</td>
</tr>
<tr>
<td>Hazardous decomposition products</td>
<td>Carbon monoxide and carbon dioxide, Hydrocarbons</td>
</tr>
<tr>
<td></td>
<td>Danger of forming toxic pyrolysis products.</td>
</tr>
</tbody>
</table>
11. TOXICOLOGICAL INFORMATION

Acute toxicity:
LD/LC50 values relevant for classification:
68610-51-5 Butylated reaction product of p-cresol and dicyclopentadiene

<table>
<thead>
<tr>
<th>Route</th>
<th>LD50/LC50</th>
<th>Value</th>
<th>Animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>LD50</td>
<td>&gt; 5000 mg/kg</td>
<td>Rat (Ratte)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IUCLID, US-EPA HPV-Report</td>
<td></td>
</tr>
<tr>
<td>Dermal</td>
<td>LD50</td>
<td>&gt; 5000 mg/kg</td>
<td>Rabbit (Kaninchen)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IUCLID, US-EPA HPV-Report</td>
<td></td>
</tr>
<tr>
<td>Inhalative</td>
<td>LC50/1,0h</td>
<td>&gt; 163 mg/ltr.</td>
<td>Rat (Ratte)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>External MSDS</td>
<td></td>
</tr>
</tbody>
</table>

Primary irritant effect:
on the skin No irritant effect.
on the eye No irritating effect. Mechanical irritation possible
Sensitization Sensitising of people disposed to that may occur.

Chronic toxicity
Inhalation of the dusts should be avoided as even inert dusts may impair respiratory organ functions.

Subacute to chronic toxicity:
68610-51-5 Butylated reaction product of p-cresol and dicyclopentadiene

<table>
<thead>
<tr>
<th>Route</th>
<th>ED05</th>
<th>Value</th>
<th>Animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>ED05</td>
<td>740 mg/kg/day</td>
<td>Rat (Ratte)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BMD (Benchmark Dose) - substance shows a slight increase in the incidence of common fetal skeletal variations.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NOAEL</td>
<td>25 mg/kg/day</td>
<td>Rat (Ratte)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>USA HPV-Program - Repeated Dose Toxicity - Subchronic 90-Day feeding study - Increased liver wt and increased adrenal wt (females only) at 1500 ppm and higher.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000 mg/kg/day</td>
<td>USA HPV-Program - Maternal Tox</td>
</tr>
</tbody>
</table>

Additional toxicological information
Not a teratogenic agent.
USA HPV-Program

12. ECOLOGICAL INFORMATION

Aquatic toxicity:
68610-51-5 Butylated reaction product of p-cresol and dicyclopentadiene

<table>
<thead>
<tr>
<th>End point</th>
<th>Value</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50</td>
<td>&gt; 0.2 mg/ltr.</td>
<td>(Daphnia magna, 48h)</td>
</tr>
<tr>
<td></td>
<td>limit of solubility, US-EPA HPV-Report</td>
<td></td>
</tr>
<tr>
<td>LC50</td>
<td>&gt; 0.2 mg/ltr.</td>
<td>(Selenastrum capricornutum 72 h)</td>
</tr>
<tr>
<td></td>
<td>limit of solubility, US-EPA HPV-Report</td>
<td></td>
</tr>
</tbody>
</table>

Persistence and degradability
Analysing method Sturm test
Degree of elimination < 1 %, 28 d
Classification Not readily biodegradable.
Behavior in environmental systems:
Bioaccumulative potential The bioaccumulation potential is considered to be negligible
Log P o/w : > 9 calculated
BCF : 3.162, log BCF 0.5, calculated, BCFWIN 2.17
Henry constant : 4.81E-11 calculated atm·m3/mol

General notes: Do not allow product to reach ground water, water course or sewage system.
Water hazard class 1 (Self-assessment): slightly hazardous for water (Germany)
No. 5241
According to appendix 3 VwVwS

Results of PBT and vPvB assessment
PBT: Not applicable; vPvB: Not applicable.

13. DISPOSAL CONSIDERATIONS

Waste treatment recommendation
Disposal considering to the local / regional / national / international regulations. Details have to be arranged with the authority concerned and / or the local waste management enterprise.

Waste disposal key
Depending on the application intended by the consumer, the allocation of waste codes according to the European waste catalogue has to be carried out in agreement with the waste disposal company and the authority.

Uncleaned packaging recommendation
Packaging may be reused or recycled after cleaning. Packagings that may not be cleansed are to be disposed of in the same manner as the product.

14. TRANSPORT INFORMATION

Land transport ADR/RID (cross-border)
ADR/RID class -
Maritime transport IMDG:
IMDG Class -
Marine pollutant No
Air transport ICAO-TI and IATA-DGR:
ICAO/IATA Class -
UN "Model Regulation" -
Special precautions for user Not applicable.
Transport/Additional information Not dangerous according to the above specifications.

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture
TSCA (Toxic Substances Control Act)
68610-51-5 Butylated reaction product of p-cresol and dicyclopentadiene Yes
IECSC Chinese Chemical Inventory of Existing Chemical Substances
68610-51-5 Butylated reaction product of p-cresol and dicyclopentadiene Yes
Australian Inventory of Chemical Substances
68610-51-5 Butylated reaction product of p-cresol and dicyclopentadiene Yes
Japan, ENCS Existing and New Chemical Substance List
68610-51-5 Butylated reaction product of p-cresol and dicyclopentadiene Yes
No. 7-2034

Korea, KEIC Korean Existing Chemical Inventory Korea
68610-51-5 Butylated reaction product of p-cresol and dicyclopentadiene Yes
No. KE-24797

Israel, IHS, Proposed Israel
Hazardous Substances List Substance is not listed.
TTCSL, Proposed Taiwan Toxic Chemical Substances List Substance is not listed.
For Research & Development only.

IARC (International Agency for the Research on Cancer) Substance is not listed.

DSL Domestic Substances List, NDSL Non-Domestic Substances List
68610-51-5 Butylated reaction product of p-cresol and dicyclopentadiene Yes
No. 18278

Philippines Inventory of Chemicals and Chemical Substances
68610-51-5 Butylated reaction product of p-cresol and dicyclopentadiene Yes

Labelling according to Regulation (EC) No 1272/2008 The substance is classified and labelled according to the CLP regulation.
Hazard pictograms Void
Signal word Void
Hazard statements H413 May cause long lasting harmful effects to aquatic life.
Precautionary statements P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P273 Avoid release to the environment.
P281 Use personal protective equipment as required.
P220 Keep away from alkaline solutions.
P220 Keep away from oxidising agents and acidic substances.
P309 IF exposed or if you feel unwell:
P314 Get medical advice/attention if you feel unwell.
P391 Collect spillage.
P401 Store in accordance with local/regional/national/international regulations.
P402+P404 Store in a dry place. Store in a closed container.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Information about limitation of use Employment restrictions concerning pregnant and lactating women must be observed.
Employment restrictions concerning juveniles must be observed.

Breakdown regulations Breakdown Directive: Not Part of Annex 1 (German Regulation)
Technical instructions (air):
Paragraph : / Class
5,2,1
Other regulations, limitations
and prohibitive regulations
BG-Device : ( Germany)
Consider BG-device " Static electrification" (Germany)
Chemical safety assessment:
A Chemical Safety Assessment has not been carried out.

16. OTHER INFORMATION

Other information
Further product information see under technical data
sheet. This information is based on our present
knowledge. However, this shall not constitute a
guarantee for any specific product features and shall not
establish a legally valid contractual relationship.

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