SECTION 1. IDENTIFICATION

Product name: DURAD® 150

Product Use Description: Flame retardants
Additive

Synonyms: Alkylated triphenyl phosphate esters

Company: LANXESS Solutions US Inc.
2 Armstrong Road
Shelton, CT 06484
United States of America (USA)
Telephone: (US) +1 866-430-2775

Emergency telephone number: CHEMTREC
(24 hours) 800-424-9300
US : 800-292-5898 (Technical inquiries)
For additional emergency telephone numbers see section 16 of the Safety Data Sheet.

Prepared by Product Safety Department
(US) +1 866-430-2775
MSDSRequest@lanxess.com

Recommended use of the chemical and restrictions on use

Recommended use: Flame retardants, Additive

Restrictions on use: Restricted to professional users.

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200

Reproductive toxicity (Oral) : Category 2

Specific target organ toxicity - repeated exposure : Category 2

Short-term (acute) aquatic hazard : Category 2

Long-term (chronic) aquatic hazard : Category 1

Long-term (chronic) aquatic hazard : Category 1
GHS label elements

Hazard pictograms

Signal word: Warning

Hazard statements:
- H361 Suspected of damaging fertility or the unborn child if swallowed.
- H373 May cause damage to organs through prolonged or repeated exposure.
- H401 Toxic to aquatic life.
- H410 Very 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.
- P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
- P273 Avoid release to the environment.
- P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:
- P308 + P313 IF exposed or concerned: Get medical advice/ attention.
- P391 Collect spillage.

Storage:
- P405 Store locked up.

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

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture: Pure substance

Substance name: Alkylated triphenyl phosphate esters

Hazardous components

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenol, isopropylated, phosphate (3:1) [Triphenyl phosphate &gt; 5%]</td>
<td>68937-41-7</td>
<td>&gt;= 90 - &lt;= 100</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES
If inhaled: Move to fresh air. Obtain medical attention.

In case of skin contact: Wash off immediately with plenty of water for at least 15 minutes. Wash off with soap and water. If symptoms persist, call a physician.

In case of eye contact: Rinse thoroughly with plenty of water, also under the eyelids. Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed: If conscious, make the victim drink the following: Drink 1 or 2 glasses of water. Get medical attention immediately.

Most important symptoms and effects, both acute and delayed: Toxic effects for reproduction

Protection of first-aiders: First Aid responders should pay attention to self-protection and use the recommended protective clothing. If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Notes to physician: The first aid procedure should be established in consultation with the doctor responsible for industrial medicine.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media: Any

Specific hazards during firefighting: Burning produces irritant fumes. Exposure to decomposition products may be a hazard to health.

Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Evacuate personnel to safe areas. Use personal protective equipment.

Environmental precautions: Discharge into the environment must be avoided. Do not contaminate water. Do not flush into surface water or sanitary sewer system.

Methods and materials for containment and cleaning up: Ventilate the area. Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).
SECTION 7. HANDLING AND STORAGE

Advice on safe handling: Handle in accordance with good industrial hygiene and safety practice. Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist.

Conditions for safe storage: Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Protect from contamination.

Further information on storage stability: Stable under recommended storage conditions.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</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>triphenyl phosphate</td>
<td>115-86-6</td>
<td>TWA</td>
<td>3 mg/m3</td>
<td>ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>3 mg/m3</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>3 mg/m3</td>
<td>OSHA P0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>3 mg/m3</td>
<td>NIOSH REL</td>
</tr>
</tbody>
</table>

Contains no substances with occupational exposure limit values.

Engineering measures: Use only with adequate ventilation. Ensure that extracted air cannot be returned to the workplace through the ventilation system. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protective equipment

Respiratory protection: In the case of vapour formation use a respirator with an approved filter.

Respirator with combination filter for vapour/particulate

Filter type: ABEK-P2-filter

Hand protection

Material: Nitrile rubber

Break through time: > 480 min

Glove thickness: 0.4 mm

Remarks: Before removing gloves clean them with soap and water.
Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. Long sleeve gloves Request information on glove permeation properties from the glove supplier.

Eye protection : Safety glasses with side-shields

Skin and body protection : To protect against splashes from pouring:
Chemical resistant apron
Impervious clothing
Rubber or plastic boots

Protective measures : These recommendations apply to the product as supplied. Please follow all applicable local/national requirements when selecting protective measures for a specific workplace.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

- **Appearance**: liquid
- **Colour**: colourless
- **Odour**: odourless
- **Odour Threshold**: No data available
- **pH**: Not applicable
- **Pour point**: -33 °F / -36 °C
  Method: ISO 3016
- **Boiling point/boiling range**: 428 - 509 °F / 220 - 265 °C
  (5.333 hPa)
- **Flash point**: >= 356 °F / 180 °C
  Method: ASTM D 93
- **Evaporation rate**: No data available
- **Upper explosion limit / Upper flammability limit**: No data available
- **Lower explosion limit / Lower flammability limit**: No data available
- **Vapour pressure**: 0.45 kPa (68 °F / 20 °C)
- **Relative vapour density**: No data available
- **Relative density**: 1.153 - 1.183 (68 °F / 20 °C)
- **Solubility(ies)**
  - **Water solubility**: insoluble
Solubility in other solvents : No data available
Partition coefficient: n-octanol/water : No data available
Auto-ignition temperature : No data available
Decomposition temperature : No data available
Self-Accelerating decomposition temperature (SADT) : Method: No information available.

Viscosity
- Viscosity, dynamic : 27 - 32 mPa.s
- Method: ASTM D 445
- Viscosity, kinematic : No data available

Oxidizing potential : No information available.
Refractive index : 1.551 (77 °F / 25 °C)
Molecular weight : No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity : No dangerous reaction known under conditions of normal use.
Chemical stability : None reasonably foreseeable.
Possibility of hazardous reactions : Hazardous polymerisation does not occur.
Conditions to avoid : Not applicable
Incompatible materials : None.
Hazardous decomposition products : Carbon oxides
                                      Oxides of phosphorus

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Inhalation
Eye contact
Skin contact
Skin Absorption

Acute toxicity

Components:
Phenol, isopropylated, phosphate (3:1) [Triphenyl phosphate > 5%]:


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Acute oral toxicity: LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity: LC50 (Rat): > 200 mg/l
  Test atmosphere: vapour

Acute dermal toxicity: LD50 (Rabbit): > 10,000 mg/kg

Skin corrosion/irritation

Product:
Species: Rabbit
Result: No skin irritation

Serious eye damage/eye irritation

Product:
Species: Rabbit
Result: No eye irritation
GLP: no

Germ cell mutagenicity

Components:
Phenol, isopropylated, phosphate (3:1) [Triphenyl phosphate > 5%]:
Genotoxicity in vitro: Test Type: Ames test
Result: negative

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 on OSHA’s list of regulated carcinogens.

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.

Reproductive toxicity

Components:
Phenol, isopropylated, phosphate (3:1) [Triphenyl phosphate > 5%]:
Effects on foetal development:
  Species: Rat
  Application Route: Oral
  General Toxicity Maternal: NOAEL: 200 mg/kg bw/day
  Developmental Toxicity: 400 mg/kg bw/day
  Method: OECD Test Guideline 414
  Result: No teratogenic effects

Reproductive toxicity - Assessment:
Some evidence of adverse effects on sexual function and fertility, based on animal experiments.
STOT - single exposure

Components:

Phenol, isopropylated, phosphate (3:1) [Triphenyl phosphate > 5%]:
Assessment : Not classified due to data which are conclusive although insufficient for classification.

STOT - repeated exposure

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

Components:

Phenol, isopropylated, phosphate (3:1) [Triphenyl phosphate > 5%]:
Exposure routes : Oral
Target Organs : Adrenal gland, Liver, Reproductive organs
Assessment : May cause damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Components:

Phenol, isopropylated, phosphate (3:1) [Triphenyl phosphate > 5%]:
Species : Rat
NOAEL : < 25 mg/kg
Application Route : Oral
Exposure time : 13 weeks
Method : OECD Test Guideline 408
Target Organs : Adrenal gland

Aspiration toxicity

Product:
No aspiration toxicity classification

Further information

Product:
Remarks : Information given is based on data on the components and the toxicology of similar products.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:
Toxicity to fish :
Remarks: Information refers to the main component.

**Components:**

**Phenol, isopropylated, phosphate (3:1) [Triphenyl phosphate > 5%]:**

**Toxicity to fish:**
- LC50 (Oncorhynchus mykiss (rainbow trout)): 1.6 mg/l
  - Exposure time: 96 h
- LC50 (Pimephales promelas (fathead minnow)): 10.8 mg/l
  - Exposure time: 96 h

**Toxicity to daphnia and other aquatic invertebrates:**
- EC50 (Daphnia magna (Water flea)): 2.44 mg/l
  - Exposure time: 48 h

**Toxicity to fish (Chronic toxicity):**
- NOEC (Pimephales promelas (fathead minnow)): 3.1 µg/l
  - Exposure time: 33 d
  - Method: OECD Test Guideline 210

**Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):**
- NOEC (Daphnia magna (Water flea)): 0.041 mg/l
  - Exposure time: 21 d
  - Method: OECD Test Guideline 211
  - GLP: yes

**M-Factor (Chronic aquatic toxicity):**
- 10

**Persistence and degradability**

**Product:**
- Biodegradability: Result: Not readily biodegradable.

**Components:**

**Phenol, isopropylated, phosphate (3:1) [Triphenyl phosphate > 5%]:**

**Biodegradability:**
- Result: According to the results of tests of biodegradability this product is not readily biodegradable.
- Biodegradation: 17.9 %
- Exposure time: 28 d

**Bioaccumulative potential**

**Product:**
- Bioaccumulation: Remarks: No data available

**Mobility in soil**

**Product:**
- Mobility: Remarks: No data available
Other adverse effects

**Product:**

Results of PBT and vPvB assessment: This substance is not considered to be persistent, bioaccumulating and toxic (PBT).

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: Information given is based on data on the components and the ecotoxicology of similar products.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues: Dispose of as hazardous waste in compliance with local and national regulations.

Dispose of wastes in an approved waste disposal facility.

SECTION 14. TRANSPORT INFORMATION

International Regulations

**IATA-DGR**

UN/ID No.: UN 3082

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Phenol, isopropylated phosphate (3:1) [Triphenyl phosphate > 5%])

Class: 9

Packing group: III

Labels: Miscellaneous

Environmentally hazardous: yes

**IMDG-Code**

UN number: UN 3082

Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Phenol, isopropylated phosphate (3:1) [Triphenyl phosphate > 5%])

Class: 9

Packing group: III

Labels: 9

EmS Code: F-A, S-F

Marine pollutant: yes

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.
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National Regulations

49 CFR

UN/ID/NA number : UN 3082
Proper shipping name : Environmentally hazardous substances, liquid, n.o.s.
(PHENOL, ISOPROPYLATED PHOSPHATE (3:1) [TRIPHENYL PHOSPHATE > 5%])
Class : 9
Packing group : III
Labels : CLASS 9
ERG Code : 171
Marine pollutant : yes (PHENOL, ISOPROPYLATED PHOSPHATE (3:1) [TRIPHENYL PHOSPHATE > 5%])

Special precautions for user
The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

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>PHENOL</td>
<td>108-95-2</td>
<td>1000</td>
<td>*</td>
</tr>
</tbody>
</table>

*: Calculated RQ exceeds reasonably attainable upper limit.

SARA 304 Extremely Hazardous Substances 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>PHENOL</td>
<td>108-95-2</td>
<td>1000</td>
<td>*</td>
</tr>
</tbody>
</table>

*: Calculated RQ exceeds reasonably attainable upper limit.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Reproductive toxicity
Specific target organ toxicity (single or repeated exposure)

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.

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).
This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).
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).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMC Intermediate or Final VOC's (40 CFR 60.489).
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.

Please note that Section 3 of this document lists only the hazardous components required by the specific country or region hazard communication regulations. The chemical identifiers listed in Section 3 are used globally for hazard communication purposes and may not reflect those used for chemical inventory coverage in a particular country or region. The chemical inventory information given in Section 15 of this document applies to the product as a whole and should be used when evaluating inventory compliance.

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
- **NZIoC**: 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
- **TCSI**: On the inventory, or in compliance with the inventory
- **US.TSCA**: On TSCA Inventory

**SECTION 16. OTHER INFORMATION**

**Further information**

**Other Emergency Phone Number**

<table>
<thead>
<tr>
<th>Latin America:</th>
<th>Brazil</th>
<th>+55 113 711 9144</th>
</tr>
</thead>
<tbody>
<tr>
<td>All other countries</td>
<td></td>
<td>+44 (0) 1235 239 670</td>
</tr>
<tr>
<td><strong>Mexico:</strong></td>
<td></td>
<td>+52 555 004 8763</td>
</tr>
</tbody>
</table>

**Full text of other abbreviations**

- **ACGIH**: USA. ACGIH Threshold Limit Values (TLV)
- **NIOSH REL**: USA. NIOSH Recommended Exposure Limits
- **OSHA P0**: USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
- **OSHA Z-1**: USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
- **ACGIH / TWA**: 8-hour, time-weighted average
- **NIOSH REL / TWA**: Time-weighted average concentration for up to a 10-hour
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DURAD® 150

Revision Date: 01/08/2019
SDS Number: 400000004910

Date of last issue: 10/18/2018
Date of first issue: 03/02/2015

workday during a 40-hour workweek

OSHA P0 / TWA : 8-hour time weighted average
OSHA Z-1 / TWA : 8-hour time weighted average

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; ICD - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - 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; KECI - 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 Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; QSAR - Quantitative Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Revision Date : 01/08/2019

The information provided in this 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.

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