

MATERIAL SAFETY DATA SHEET



Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

Effective Date: 13-Dec-07
Product Code: 103727
MSDS: 004417

SONALAN* HFP HERBICIDE

1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: Sonalan* HFP Herbicide

COMPANY IDENTIFICATION:

Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, IN 46268-1189

2. HAZARDOUS IDENTIFICATIONS:

EMERGENCY OVERVIEW

Light orange liquid with aromatic odor. May cause eye irritation with corneal injury and drying or flaking of the skin. Product is combustible. Do not use or store near open flame. Do not reuse tanks containing phenoxy-type herbicides for Sonalan products. Avoid freezing. Toxic to aquatic organisms.

EMERGENCY PHONE NUMBER: 800-992-5994

3. COMPOSITION/INFORMATION ON INGREDIENTS:

Component	CAS Number	W/W%
Ethalfuralin	55283-68-6	35.4
Cyclohexanone	108-94-1	14.8
Xylene	1330-20-7	1.3
1,2,4-Trimethylbenzene	95-63-6	13.3
Cumene	98-82-8	1.8
Balance		33.4

4. FIRST AID:

EYES: Hold eyes open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, and then continue rinsing eyes. Call a poison control center or doctor for treatment advice.

SKIN: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

INGESTION: Immediately call a poison control center or doctor. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give any liquid to the person. Do not give anything by mouth to an unconscious person.

INHALATION: Move person to fresh air. If person is not breathing, call 911 or ambulance, then give artificial respiration, if by mouth to mouth use rescuer protection (pocket mask etc). Call a poison control center or doctor for treatment advice. If breathing is difficult, oxygen should be administered by qualified personnel.

NOTE TO PHYSICIAN: Because rapid absorption may occur through the lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by a physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES:

FLASH POINT: 119°F (48°C)

METHOD USED: SCC

FLAMMABLE LIMITS

LFL: 1.5 +/- 0.1 volume % at 100°C, in air

UFL: 8.5 +/- 0.5 volume % at 120°C, in air

EXTINGUISHING MEDIA: Use water, CO₂ or dry chemicals.

FIRE AND EXPLOSION HAZARDS:

Combustible liquid. Emits toxic fumes when heated to decomposition. Closed containers may explode due to pressure buildup when subjected to excessive heat or fire. Ethalfuralin itself may generate significant pressures when exposed to elevated temperature. Although ethalfuralin in solution is not likely to exhibit this property, caution should be exercised in situations, which result in loss of solvent.

FIRE-FIGHTING EQUIPMENT: Wear positive-pressure, self-contained breathing apparatus and full protective clothing.

6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS: Use compatible absorbent material to contain and cleanup small spills and dispose as waste. Report large spills to Dow AgroSciences at 800-992-5994. Prohibit use of hot or sparking equipment in immediate area. Prevent runoff.

MATERIAL SAFETY DATA SHEET



Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

Effective Date: 13-Dec-07
Product Code: 103727
MSDS: 004417

SONALAN* HFP HERBICIDE

7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

Handling: Keep out of reach of children. Sonalan HFP formulation is irritating to the eyes, and skin. Avoid breathing vapors. Avoid contact with skin, eyes, or clothing. Do not contaminate foodstuffs and feed. Harmful if swallowed or absorbed through the skin. Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Read product label for personal protective equipment which may be required by the Worker Protection Standard for early entry to treated areas.

Storage: Store in original container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where a potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINE(S):

Ethalfuralin: Dow AgroSciences Industrial Hygiene Guide is 3 mg/M³.

Cyclohexanone: ACGIH TLV is 20 ppm, 50 ppm STEL; Skin; A3. OSHA PEL is 50 ppm TWA.

Trimethylbenzene: ACGIH TLV is 25 ppm.

Xylene: ACGIH TLV is 100 ppm TWA, 150 ppm STEL. OSHA PEL is 100 ppm TWA.

A "skin" notation following the exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact. It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guidelines. When respiratory protection is required, use a NIOSH approved air-purifying or positive-pressure supplied-air respirator depending on the potential airborne concentration. For emergency and other conditions where the exposure guideline may be exceeded, use a NIOSH approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply.

SKIN PROTECTION: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur.

EYE/FACE PROTECTION: Use chemical goggles. If exposure causes eye discomfort, use a NIOSH approved full-face respirator.

APPLICATORS AND ALL OTHER HANDLERS: Refer to the product label for personal protective clothing and equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES:

BOILING POINT: ~313°F (~156°C) (solvent)

VAPOR PRESSURE: Not determined

VAPOR DENSITY: Not determined

SOLUBILITY IN WATER: Emulsifies in water

SPECIFIC GRAVITY: 1.02 @ 20°C (68°F)

APPEARANCE: Orange liquid

ODOR: Aromatic

pH: (1% aqueous) 5.0

10. STABILITY AND REACTIVITY:

STABILITY: (CONDITIONS TO AVOID) Combustible liquid. Do not use or store near open flame. Tanks that have been used for phenoxy-type herbicides should not be used for Sonalan products. Heating ethalfuralin technical to temperatures above 70°C (158°F) can lead to violent reaction with rapid pressure buildup.

MATERIAL SAFETY DATA SHEET



Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

Effective Date: 13-Dec-07
Product Code: 103727
MSDS: 004417

SONALAN* HFP HERBICIDE

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID)
Avoid freezing.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen chloride, hydrogen fluoride, and nitrogen oxides may be formed.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION:

POTENTIAL HEALTH EFFECTS: This section includes possible adverse effects, which could occur if this material is not handled in the recommended manner.

EYE: May cause moderate eye irritation with corneal injury. In humans, eye irritation resulted from brief (minutes) exposure to cyclohexanone vapor concentrations of 50 ppm and above.

SKIN: May cause drying and flaking of the skin. Prolonged contact may cause severe skin irritation with local redness and discomfort. Prolonged or frequently repeated skin contact may cause allergic skin reactions in some individuals. Prolonged skin contact is unlikely to result in absorption of harmful amounts. The LD₅₀ for skin absorption in rabbits is >5 ml/kg.

INGESTION: Low toxicity if swallowed. The oral LD₅₀ for rats is 3267 mg/kg. Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Aspiration into the lungs may occur during ingestion or vomiting resulting in rapid absorption and injury to other body systems.

INHALATION: Prolonged exposure is not expected to cause adverse effects. The LC₅₀ for rats was 5.0 mg/L for 4 hours.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Contains ethalfuralin, which in animals, has been shown to cause liver, kidney, thyroid and blood effects. Hypothermia has occurred in animals following skin or inhalation exposures to cyclohexanone. Xylene, a minor component of this mixture, is reported to have caused hearing loss in laboratory animals upon inhalation of high concentrations; such effects have not been reported in humans.

CANCER INFORMATION: Ethalfuralin did not cause tumors in long term studies; however, an increase in benign mammary fibro adenomas was seen in female rats. Xylene was not found to be carcinogenic in a National Toxicology Program bioassay in rats and mice.

TERATOLOGY (BIRTH DEFECTS): Ethalfuralin and the solvent have caused birth defects in laboratory animals only at doses toxic to the mother. Very high concentrations of the solvent (producing severe toxicity to adult animals) induced an increase in cleft palate in mice, which is a common developmental abnormality in mice and is associated with stress to the maternal animals. No malformations were induced at exposures less than those causing severe toxicity to the adult animals. Cyclohexanone did not cause birth defects; other fetal effects occurred only at doses toxic to the mother. This product contains low levels of xylene. Exaggerated doses of xylene given orally to pregnant mice resulted in an increase in cleft, a common developmental abnormality in mice. Inhalation exposure of pregnant animals to xylene resulted in toxicity to the fetus but did not cause any birth defects.

REPRODUCTIVE EFFECTS: Ethalfuralin did not interfere with reproduction in animal studies. Cyclohexanone caused reduced growth and survival of offspring in an animal reproduction study. Dose levels producing this effect also caused central nervous system effects in parental animals. In a 3-generation reproduction study on the solvent, the only effects observed were at exposures that produced severe toxicity to the parent animals.

MUTAGENICITY: For ethalfuralin, in vitro genetic toxicity studies were predominantly negative and animal genetic toxicity studies were negative. For cyclohexanone, in-vitro genetic toxicity studies were negative in some cases and positive in other cases. Animal genetic toxicity studies were inconclusive. Results of in-vitro and animal genetic toxicity studies on the solvent have been negative.

*Trademark of Dow AgroSciences LLC

MATERIAL SAFETY DATA SHEET



Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

Effective Date: 13-Dec-07
Product Code: 103727
MSDS: 004417

SONALAN* HFP HERBICIDE

12. ECOLOGICAL INFORMATION:

ENVIRONMENTAL FATE:

MOVEMENT & PARTITIONING:

Based largely or completely on data for major components.
Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).

DEGRADATION & PERSISTENCE:

Based largely or completely on information for ethalfluralin.
Degradation is expected in the soil environment within months to years.

Based largely or completely on information for cyclohexanone.

Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD is >40%).

ECOTOXICOLOGY:

Based largely or completely on information for ethalfluralin.
Material is highly toxic to aquatic organisms on an acute basis (LC₅₀/EC₅₀ between 0.1 and 1 mg/L in most sensitive species).

Based largely or completely on information for cyclohexanone.

Material is practically non-toxic to aquatic organisms on an acute basis (LC₅₀ or EC₅₀ is >100 mg/L in most sensitive species).

Based largely or completely on information for the solvent.

Material is moderately toxic to aquatic organisms on an acute basis (LC₅₀ or EC₅₀ is between 1 and 10 mg/L in most sensitive species).

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities. This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. If the material as supplied becomes a waste, follow all applicable regional, national and local laws and regulations.

14. TRANSPORT INFORMATION:

U.S. DEPARTMENT OF TRANSPORTATION INFORMATION:

For non-bulk shipments by road:
This material is not regulated for transport.

For non-bulk shipments by air and/or vessel:
FLAMMABLE LIQUIDS, N.O.S./ (CONTAINS CYCLOHEXANONE, 1,2,4-TRIMETHYLBENZENE)/3/ UN1993/PG III

For bulk shipments:
FLAMMABLE LIQUIDS, N.O.S./ (CONTAINS CYCLOHEXANONE, 1,2,4-TRIMETHYLBENZENE)/3/ UN1993/PG III/RQ (XYLENE, CYCLOHEXANONE)

15. REGULATORY INFORMATION:

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

U.S. REGULATIONS

SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

An immediate health hazard
A delayed health hazard
A fire hazard

*Trademark of Dow AgroSciences LLC

MATERIAL SAFETY DATA SHEET



Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

Effective Date: 13-Dec-07
Product Code: 103727
MSDS: 004417

SONALAN* HFP HERBICIDE

TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

CHEMICAL NAME	CAS NUMBER	LIST
1,2,4-Trimethylbenzene	95-63-6	PA1 PA3
Cyclohexanone	108-94-1	PA1 PA3
Xylene (mixed isomers)	1330-20-7	PA1 PA3
Cumene	98-82-8	PA1 PA3

PA1=Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).

PA3=Pennsylvania Environmental Hazardous Substance (present at greater than or equal to 1.0%).

OSHA HAZARD COMMUNICATION STANDARD: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

Category	Rating
Health	2
Flammability	2
Reactivity	1

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND): This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA, which may require reporting of releases:

<u>Chemical Name</u>	<u>CAS Number</u>	<u>RQ</u>	<u>% in Product</u>
Cyclohexanone	000108-94-1	5000	14.8%
Xylene	001330-20-7	100	1.3%
Cumene	98-82-8	5000	1.8%

16. OTHER INFORMATION:

MSDS STATUS: Revised Sections: 3 & 15
Replaces MSDS Dated 9/13/05
Document Code: D03-042-769
Replaces Document Code: D03-042-768
Reference: TIME*20605

The Information Herein Is Given In Good Faith, But No Warranty, Express or Implied, Is Made. Consult Dow AgroSciences for Further Information.