SAFETY DATA SHEET

1. Identification

Product identifier **ACTION**

Other means of identification

SDS number 504

Product registration number 59639-82-5481

Recommended use Cotton Defoliant.

Recommended restrictions No other uses are advised.
Keep out of the Reach of Children!

EPA Registration number EPA: 59639-82-5481

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name AMVAC Chemical Corporation

Address 4685 MacArthur Court
Suite 1200
Newport Beach, CA 92660

Telephone AMVAC Chemical Corp 949-260-1200
AMVAC Chemical Corp 949-260-6270(FAX)

Website www.Amvac-Chemical.com

E-mail CustServ@Amvac-Chemical.com

Emergency phone number

Medical	888-681-4261
CHEMTREC® (USA+Canada)	800-424-9300
Product Use	888-462-6822
CHEMTREC® (Outside USA)	+1-703-527-3887

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards

Acute toxicity, inhalation	Category 3
Germ cell mutagenicity	Category 1B
Carcinogenicity	Category 1B
Aspiration hazard	Category 1

Environmental hazards

Hazardous to the aquatic environment, acute hazard	Category 2
Hazardous to the aquatic environment, long-term hazard	Category 2

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Toxic if inhaled.
May be fatal if swallowed and enters airways.
May cause genetic defects.
May cause cancer.
Toxic to aquatic life.
Toxic to aquatic life with long lasting effects.

Precautionary statement

Prevention	Read label before use. Avoid breathing vapors. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.
Response	If swallowed: Immediately call a poison center/doctor. Do NOT induce vomiting. If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor. Collect spillage.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information This is a pesticide product registered by the United States Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS), and for workplace labels of non-pesticide chemicals. The hazard information required on the pesticide label is reproduced in section 15. The pesticide label also includes other important information, including directions for use.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Flumiclorac Pentyl Ester		87546-18-7	10.1

Additional components

Chemical name	Common name and synonyms	CAS number	%
Total Hydrocarbons	Aromatic Solvent	64742-94-5	35 - 40
2-Methylnaphthalene		91-57-6	18 - 23
Methyl Naphthalene, Alpha-		90-12-0	6 - 12
Naphthalene		91-20-3	10 - 15
Others		N/A	1 - 10
2-Ethyl hexanol		104-76-7	1 - 4

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a poison center or doctor/physician.

Skin contact Wash off with soap and water. Get medical attention if irritation develops and persists.

Eye contact Rinse with water. Get medical attention if irritation develops and persists.

Ingestion Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Most important symptoms/effects, acute and delayed Aspiration may cause pulmonary edema and pneumonitis.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General information IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media Foam. Powder. Carbon dioxide (CO2).

Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Avoid inhalation of vapors and spray mists. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Prevent entry into waterways, sewer, basements or confined areas. Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. Put material in suitable, covered, labeled containers. For waste disposal, see section 13 of the SDS. FOR SPILLS ON LAND: FOR SPILLS IN WATER: CONTAINMENT: This product forms an emulsion in water. Stop or reduce contamination of any water. Isolate contaminated water. CLEANUP: Remove contaminated water for treatment or disposal.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store locked up. Store in tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Additional components	Type	Value
Naphthalene (CAS 91-20-3)	PEL	50 mg/m3
		10 ppm
Total Hydrocarbons (CAS 64742-94-5)	PEL	400 mg/m3
		100 ppm

US. ACGIH Threshold Limit Values

Additional components	Type	Value	Form
Methyl Naphthalene, Alpha- (CAS 90-12-0)	TWA	0.5 ppm	
Naphthalene (CAS 91-20-3)	TWA	10 ppm	
2-Methylnaphthalene (CAS 91-57-6)	TWA	0.5 ppm	
Total Hydrocarbons (CAS 64742-94-5)	TWA	200 mg/m3	Non-aerosol.

US. NIOSH: Pocket Guide to Chemical Hazards

Additional components	Type	Value
Naphthalene (CAS 91-20-3)	STEL	75 mg/m3
		15 ppm
	TWA	50 mg/m3
		10 ppm

Biological limit values

ACGIH Biological Exposure Indices

Additional components	Value	Determinant	Specimen	Sampling Time
2-Methylnaphthalene (CAS 91-57-6)	2.5 µg/l	1-Hydroxypyrene, with hydrolysis (1-HP)	Urine	*

* - For sampling details, please see the source document.

Exposure guidelines

US - California OELs: Skin designation

Naphthalene (CAS 91-20-3)	Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

2-Methylnaphthalene (CAS 91-57-6)	Can be absorbed through the skin.
Methyl Naphthalene, Alpha- (CAS 90-12-0)	Can be absorbed through the skin.
Naphthalene (CAS 91-20-3)	Can be absorbed through the skin.
Total Hydrocarbons (CAS 64742-94-5)	Can be absorbed through the skin.

Appropriate engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection Chemical respirator with organic vapor cartridge and full facepiece.

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Do not get this material in contact with skin or clothing. Use of an impervious apron is recommended. Long-sleeved shirt and long pants or coveralls, socks and closed toe shoes are required.

Respiratory protection Chemical respirator with organic vapor cartridge and full facepiece.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Observe any medical surveillance requirements. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance Clear.

Physical state Liquid.

Form Liquid.

Color Medium red to dark brown

Odor Aromatic

Odor threshold Not available.

pH 6.1 1% emulsion

Melting point/freezing point Not available.

Initial boiling point and boiling range Not available.

Flash point > 199 °F (> 93 °C)

Evaporation rate Not available.

Flammability (solid, gas) Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	1.10E-05 hPa estimated
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	11 cP 30 rpm 14 cP 60 rpm
Viscosity temperature	77 °F (25 °C)
Other information	
Density	8.51 lb/gal @ 20°C
Explosive properties	Not explosive.
Flammability class	Combustible IIIA estimated
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
Incompatible materials	None known.
Hazardous decomposition products	Emits hazardous fumes and smoke of unknown composition when heated to decomposition or burned.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Toxic if inhaled.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Causes serious eye irritation.
Ingestion	Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia.
Symptoms related to the physical, chemical and toxicological characteristics	Aspiration may cause pulmonary edema and pneumonitis.

Information on toxicological effects

Acute toxicity May be fatal if swallowed and enters airways. Toxic if inhaled.

Product	Species	Test Results
ACTION		
Acute		
Dermal		
Liquid		
LD50	Rabbit	> 2000 mg/kg (Tox Category III)

Product	Species	Test Results
Oral		
Liquid		
LD50	Rat	4100 mg/kg Male
		3200 mg/kg Female (Tox Category III)

Skin corrosion/irritation Causes skin irritation.

Irritation Corrosion - Skin

ACTION , (Tox Category II)
Result: Irritating
Species: Rabbit
Organ: skin
Severity: Moderately

Serious eye damage/eye irritation Causes serious eye irritation.

Irritation Corrosion - Eye

ACTION , (Tox Category II)
Result: Irritating
Species: Rabbit
Organ: eye
Severity: Severely

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Skin sensitization

ACTION , Non-sensitizer (Buehler)
Species: Guinea pig
Organ: skin

Germ cell mutagenicity May cause genetic defects. Flumiclorac Pentyl Technical was not mutagenic in most assays: gene mutation (with and without S-o activation), unscheduled DNA synthesis, in vitro chromosomal aberration (with S-9), and in vivo mouse absence of S-o metabolic activation. Overall, Flumiclorac Pentyl Technical is not a genetic hazard.

Carcinogenicity Effects of long-term high dose exposures to Flumiclorac pentyl Technical in rodents and/or dogs consisted primarily of increases in kidney and liver weights, slight changes in blood biochemistry, and histological changes in the liver. the lowest NOEL was 300 ppm in the mouse study. Flumiclorac Pentyl Technical was not carcinogenic in either rats or mice.
Chronic (long-term) exposure of workers and rodents to naphthalene has been reported to cause cataracts and damage to the retina. Lesions in the kidneys and thymus, signs of anemia, and reduced spleen weights have been observed in rats and mice chronically exposed via gavage. A National Toxicology Program (NTP) report states that lifetime inhalation exposure to naphthalene resulted in increases in tumors of the nose in rats. In another NTP study, lifetime inhalation exposure to naphthalene increased lung tumors in female mice. The relevance of the rodent findings to humans is unknown. Naphthalene has been listed by the International Agency for Research on Cancer (IARC) as possibly carcinogenic to humans (Group 2B).

IARC Monographs. Overall Evaluation of Carcinogenicity

Naphthalene (CAS 91-20-3) 2B Possibly carcinogenic to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Naphthalene (CAS 91-20-3) Reasonably Anticipated to be a Human Carcinogen.

Reproductive toxicity Reproductive toxicity (higher rate of F1 pup deaths on Day 0 of lactation) as well as systemic toxicity were observed in rats at doses of 10,000 and 20,000 ppm Flumiclorac Pentyl Technical in a two-generation rat reproduction study. A repeat study for one generation did not confirm the reproductive toxicity finding. Thus, Flumiclorac Pentyl Technical is not considered a reproductive toxicant.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard May be fatal if swallowed and enters airways.

Chronic effects

This product contains a solvent. Solvents, when inhaled, can cause nasal and respiratory irritation and central nervous system effects including dizziness, weakness, fatigue, nausea, headache and possibly unconsciousness and even death. ingestion of solvents can cause gastrointestinal irritation, nausea, vomiting and diarrhea. Prolonged or repeated dermal exposures may cause drying, scaling and even blistering of the skin. Aspiration of low viscosity products can cause chemical pneumonitis which can be fatal. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Symptoms include fatigue, concentration difficulties, anxiety, depression, rapid mood swings and short-term memory loss. The reports are not clear with regard to the types of solvents that may cause these symptoms, and there is controversy among scientists to whether the condition exists or is caused by this type of product. Since many other diseases cause some or all of these conditions, a doctor should be consulted if any appear. Acute exposure to naphthalene by inhalation, ingestion, and dermal contact has been associated with hemolytic anemia, damage to the kidneys, cataracts, and, in infants, brain damage. There is limited evidence of fetal and maternal toxicity from exposure to naphthalene.

12. Ecological information

Ecotoxicity

Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the environment.

Product		Species	Test Results
ACTION			
Other	LC50	Duck	> 5620 ppm
	LD50	Quail	> 2250 mg/kg
	NOEC	Duck	250 ppm
		Quail	500 ppm
Aquatic			
Crustacea	LC50	Daphnia magna	> 38 mg/l, 48 hours
		Shrimp (Mysidopsis juniae)	0.56 mg/l, 96 hours
Fish	LC50	Bluegill (Lepomis macrochirus)	17.4 mg/l, 96 hours
		Rainbow Trout (oncorhynchus mykiss)	1.1 mg/l, 96 hours
		Sheepshead minnow (Cyprinodon variegatus)	> 24 mg/l, 96 hours

Persistence and degradability No data is available on the degradability of any ingredients in the mixture.

Bioaccumulative potential No data available.

Mobility in soil No data available.

Other adverse effects Flumiclorac Pentyl Technical is practically non-toxic to bees. The acute contact LD50 is greater than 106 µg/bee.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions). Dispose of in accordance with all applicable regulations.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers. Triple rinse (or equivalent).

14. Transport information

DOT

UN number UN3082

UN proper shipping name Environmentally hazardous substances, liquid, n.o.s. (Flumiclorac Pentyl)

Transport hazard class(es)

Class 9

Subsidiary risk -

Label(s) 9

Packing group	III
Environmental hazards	
Marine pollutant	Yes (in bulk or non-bulk by water)
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	8, 146, 335, IB3, T4, TP1, TP29
Packaging exceptions	155
Packaging non bulk	203
Packaging bulk	241

IATA

UN number	UN3082
UN proper shipping name	Environmentally hazardous substance, liquid, n.o.s. (Flumiclorac pentyl)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	III
Environmental hazards	Yes
ERG Code	9L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

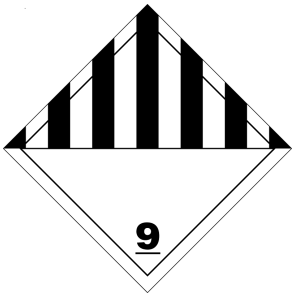
Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN3082
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Flumiclorac pentyl), MARINE POLLUTANT
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	Yes
EmS	F-A, S-F
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

DOT; IATA; IMDG



Marine pollutant

General information IMDG Regulated Marine Pollutant.

15. Regulatory information

US federal regulations

Do not get in eyes, on skin, or on clothing.
This product is registered under EPA/FIFRA Regulations. It is a violation of Federal Law to use this product in any manner inconsistent with its labeling. Read and follow all label directions. This product is excluded from listing requirements under EPA/TSCA.

This chemical is a pesticide product registered by the United States Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS), and for workplace labels of non-pesticide chemicals. The hazard information required on the pesticide label is reproduced below. The pesticide label also includes other important information, including directions for use.

EPA FIFRA SIGNAL WORD: WARNING

Causes substantial but temporary eye injury.
Causes skin irritation
Harmful if swallowed or absorbed through skin
KEEP OUT OF REACH OF CHILDREN! This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Naphthalene (CAS 91-20-3) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

Classified hazard categories
Acute toxicity (any route of exposure)
Germ cell mutagenicity
Carcinogenicity
Aspiration hazard

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Naphthalene	91-20-3	10 - 15

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

2-Methylnaphthalene (CAS 91-57-6)
Naphthalene (CAS 91-20-3)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

California Proposition 65

WARNING: This product can expose you to Naphthalene, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

California Proposition 65 - CRT: Listed date/Carcinogenic substance

Naphthalene (CAS 91-20-3) Listed: April 19, 2002

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

2-Methylnaphthalene (CAS 91-57-6)

Methyl Naphthalene, Alpha- (CAS 90-12-0)
Naphthalene (CAS 91-20-3)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date Jul-15-2015

Revision date Aug-31-2018

References

ACGIH®: American Conference of Governmental Industrial Hygienists
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
EPA: Environmental Protection Agency
FIFRA: Federal Insecticide, Fungicide, and Rodenticide Act
IARC: International Agency for Research on Cancer
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Agency
SARA: Superfund Amendments and Reauthorization Act
TSCA: Toxic Substances Control Act
DOT: Department of Transportation
IMDG: International Maritime Dangerous Goods
IATA: International Air Transport Association

Version # 1.0

HMIS® ratings

Health: 2
Flammability: 1
Physical hazard: 0

NFPA ratings

Health: 2
Flammability: 1
Instability: 0

Disclaimer

This information is provided for the limited guidance to the user. While AMVAC believes that the information is, as of the date hereof, reliable, it is the user's responsibility to determine the suitability of the information for its purposes. The user is advised not to construe the information as absolutely complete since additional information may be necessary or desirable when particular, exceptional, or variable conditions or circumstances exist (like combinations with other materials), or because of applicable regulations. No express or implied warranty of merchantability or fitness for a particular purpose or otherwise is made hereunder with respect to the information or the product to which the information relates.
AMVAC Chemical Corporation cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use.