MATERIAL SAFETY DATA SHEET

HERO™ INSECTICIDE

MSDS Ref. No.: F18-45-9
Date Approved: 05/04/2007
Revision No.: 3

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200; the EC directive, 2001/58/EC and other regulatory requirements. The information contained herein is for the concentrate as packaged, unless otherwise noted.

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	HERO™ INSECTICIDE
PRODUCT CODE:	6322
ACTIVE INGREDIENT(S):	Bifenthrin*; Zeta-cypermethrin**
CHEMICAL FAMILY:	Pyrethroid Pesticide
MOLECULAR FORMULA:	$C_{23}H_{22}ClF_3O_2$ (bifenthrin); $C_{22}H_{19}Cl_2NO_3$ (zeta-cypermethrin)
SYNONYMS:	FMC 54800; (2-methyl[1,1'-biphenyl]-3-yl)methyl 3-(2-chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylate; IUPAC: 2-methylbiphenyl-3-ylmethyl (Z)-(1RS)-cis-3-(2-chloro-3,3,3-trifluoroprop-1-enyl)-2,2-dimethylcyclopropanecarboxylate*; FMC 233570; Cyclopropanecarboxylic acid, cis-(+)-3-(2,2-dichloroethenyl)-2,2-dimethyl-, (S)-cyano(3-phenoxyphenyl)methyl ester, AND Cyclopropanecarboxylic acid, trans-(+)-3-(2,2-dichloroethenyl)-2,2-dimethyl-, (S)-cyano(3-phenoxyphenyl)methyl ester)**

ADDITIONAL SYNONYMS: F6113 (formulation)

MANUFACTURER

FMC CORPORATION
Agricultural Products Group
1735 Market Street
Philadelphia, PA 19103
(215) 299 6000 (General Information)
msdsinfo@fmc.com (Email - General Information)

EMERGENCY TELEPHONE NUMBERS

(800) 331-3148 (FMC - U.S.A. & Canada)
(716) 735-3765 (FMC - Reverse charges)

For leak, fire, spill, or accident emergencies, call:
(800) 424-9300 (CHEMTREC - U.S.A. & Canada)
(703) 527-3887 (CHEMTREC - All Other Countries)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- Amber liquid with an aromatic hydrocarbon odor.
- Slightly combustible. May support combustion at elevated temperatures.
- Thermal decomposition and burning may form toxic by-products.
- Highly toxic to fish and aquatic organisms. Keep out of drains and water courses.
- Moderately irritating to the skin.

POTENTIAL HEALTH EFFECTS: Effects from overexposure result from either swallowing, inhaling, or coming into contact with the eyes or skin. Symptoms of overexposure include tremors, convulsions, increased sensitivity to touch, and incoordination. Contact with zeta-cypermethrin may produce skin sensations such as numbing, burning and tingling. These sensations are reversible and usually subside within 12 hours.

MEDICAL CONDITIONS AGGRAVATED: None presently known.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt.%	EC No.	EC Class
Bifenthrin	82657-04-3	11.25	None	R25-20-43-50/53; S1/2-23-24-37-38-45-29
Zeta-cypermethrin	52315-07-8	3.75	257-842-9	Not classified
Aromatic Hydrocarbons	64742-94-5	<46	265-198-5	R65; S2-23-24-62
Surfactant Blend		<7	None	Not classified
Naphthalene	91-20-3	<6	202-049-5	R22-40-50/53; S2-36/37-46-60-61
Acetic Acid	64-19-7	0.1	200-580-7	R10-34-35-36/38; S1/2-23-26-45

4. FIRST AID MEASURES

EYES: Flush with water for at least 15 minutes. If irritation occurs and persists, obtain medical attention.

SKIN: Remove contaminated clothing and thoroughly wash with soap and water. If irritation occurs and persists, contact a medical doctor.

INGESTION: Do not induce vomiting and do not give liquids of any kind to the person. Never give anything by mouth to an unconscious person. See a medical doctor immediately.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.

NOTES TO MEDICAL DOCTOR: This product has low oral, dermal and inhalation toxicity. It is mildly irritating to the eyes, and moderately irritating to the skin, and it is a skin sensitizer. Contains aromatic hydrocarbons that may produce a severe pneumonitis if aspirated during vomiting. Consideration should be given to gastric lavage with an endotracheal tube in place. Reversible skin sensations (paresthesia) may occur and ordinary skin salves have been found useful in reducing discomfort. Treatment is otherwise controlled removal of exposure followed by symptomatic and supportive care.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Foam, CO_2 or dry chemical. Soft stream water fog only if necessary. Contain all runoff.

FIRE / EXPLOSION HAZARDS: Slightly combustible. This material may support combustion at elevated temperatures.

FIRE FIGHTING PROCEDURES: Isolate fire area. Evacuate downwind. Wear full protective clothing and self-contained breathing apparatus. Do not breathe smoke, gases or vapors generated.

6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES: Isolate and post spill area. Wear protective clothing and personal protective equipment as prescribed in Section 8, "Exposure Controls/Personal Protection". Keep unprotected persons and animals out of the area.

Keep material out of lakes, streams, ponds and sewer drains. Dike to confine spill and absorb with a non-combustible absorbent such as clay, sand or soil. Vacuum, shovel or pump waste into a drum and label contents for disposal.

To clean and neutralize contaminated area, scrub area with a solution of detergent (e.g. commercial product such as SuperSoap™, Tide®, Spic and Span®, or other high pH detergent) and water. Let solution sit for 5 minutes. Use a stiff brush to scrub affected area. Repeat if necessary to remove visible staining. Additional decontamination can be made by applying bleach (Clorox® or equivalent) to affected area.

Absorb wash-liquid as noted above, remove visibly contaminated soil and place into recovery / disposal container (plastic, open-top steel drum or equivalent). Place all clean-up material in a container, seal and dispose of in accordance with the method outlined in Section 13 "Disposal Considerations" below.

For further information on spill clean-up, waste disposal, or return of salvaged product, call the FMC Emergency Hotline number listed in Section 1 "Product and Company Identification" above.

7. HANDLING AND STORAGE

HANDLING AND STORAGE: Do not freeze. Keep out of reach of children and animals. Store in original containers only; and, in a cool, dry, well-ventilated place. Do not use or store near heat, open flame or hot surfaces. Carefully open containers. After partial use, replace lid and close tightly. Do not put concentrate or dilute material into food or drink containers. Do not contaminate other pesticides, fertilizers, water, food or feed by storage or disposal.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Use local exhaust at all process locations where vapor or mist may be emitted. Ventilate all transport vehicles prior to unloading.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: For splash, mist or spray exposure, wear chemical protective goggles or a face shield.

RESPIRATORY: For splash, mist or spray exposures wear, as a minimum, a properly fitted half-face or full-face air-purifying respirator which is approved for pesticides (U.S. NIOSH/MSHA, EU CEN or comparable certification organization). Respirator use and selection must be based on airborne concentrations.

PROTECTIVE CLOTHING: Depending upon concentrations encountered, wear coveralls or long-sleeved uniform and head covering. For larger exposures as in the case of spills, wear full body cover barrier suit, such as a PVC suit. Leather items - such as shoes, belts and watchbands - that become contaminated should be removed and destroyed. Launder all work clothing before reuse (separately from household laundry).

GLOVES: Wear chemical protective gloves made of materials such as nitrile, neoprene or Viton® brand. Thoroughly wash the outside of gloves with soap and water prior to removal. Inspect regularly for leaks.

WORK HYGIENIC PRACTICES: Clean water should be available for washing in case of eye or skin contamination. Wash skin prior to eating, drinking, chewing gum, or using tobacco. Shower at the end of the workday.

COMMENTS:

Personal protective recommendations for mixing or applying this product are prescribed on the product label. Information stated above provides useful, additional guidance for individuals whose use or handling of this product is not guided by the product label.

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9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	Aromatic hydrocarbon
APPEARANCE:	Amber liquid
DENSITY / WEIGHT PER VOLUME:	8.26 lbs/gal (9904 g/L)
FLASH POINT:	110 °C (230 °F)
MOLECULAR WEIGHT:	422.9 (bifenthrin) 416.3 (zeta-cypermethrin)
pH:	4.2 (1% solution) at 24ºC (75.2ºF)
SPECIFIC GRAVITY:	0.9224 @ 20°C (water = 1)

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10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Excessive heat and fire.
STABILITY:	Stable
POLYMERIZATION:	Will not occur
HAZARDOUS DECOMPOSITION PRODUCTS:	Carbon monoxide, carbon dioxide, hydrogen cyanide, chlorine and hydrogen chloride.

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11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: Mildly irritating (rabbit)

SKIN EFFECTS: Moderately irritating (rabbit)

DERMAL LD_{50}: > 5,000 mg/kg (rat)

ORAL LD_{50}: 550 mg/kg (rat)

INHALATION LC_{50}: 1.8 mg/l (4 h) (rat)

SENSITIZATION: (Skin) Sensitizing (guinea pig)

ACUTE EFFECTS FROM OVEREXPOSURE: This product has low oral, dermal and inhalation toxicity. It is mildly irritating to the eyes, and moderately irritating to the skin, and it is a skin sensitizer.

Large doses of bifenthrin ingested by laboratory animals produced signs of toxicity including convulsions, tremors and bloody nasal discharge. Bifenthrin does not cause acute delayed neurotoxicity. Experience to date indicates that contact with bifenthrin may occasionally produce skin sensations such as rashes, numbing, burning or tingling. These sensations are reversible and usually subside within 12 hours.

Large doses of zeta-cypermethrin, ingested by laboratory animals, may produce signs of toxicity including tremors, incoordination, convulsions, staggered gait, and oral discharge. Experience to date indicates that contact with zeta-cypermethrin may produce skin sensations such as numbing, burning or tingling. These sensations are reversible and usually subside within 12 hours.

Experience to date indicates that contact with the active ingredients in this product may produce skin sensations such as numbing, burning, and tingling. These sensations are reversible and usually subside within 12 hours.

Inhalation of aromatic hydrocarbon vapors may cause dizziness, disturbances in vision, drowsiness, respiratory irritation, and eye, skin and mucous membrane irritation. Vomiting after ingestion of this product may cause aspiration of aromatic hydrocarbons into the lungs, which may result in fatal pulmonary edema.

Naphthalene, if ingested, may cause red blood cell hemolysis, especially in individuals with glucose-6-phosphate dehydrogenase deficiency.

Ingestion of acetic acid may cause severe corrosion of the mouth and gastrointestinal tract, with vomiting, hematemesis, diarrhea, circulatory collapse, uremia and death.

CHRONIC EFFECTS FROM OVEREXPOSURE: No data available for the formulation. In studies with laboratory animals, bifenthrin did not cause reproductive toxicity or teratogenicity. Tremors were associated with repeated exposure of laboratory animals to bifenthrin. In lifetime feeding studies conducted with laboratory animals, a slight increase in the incidence of urinary bladder tumors at the highest dose in male mice was considered to be an equivocal response, not evidence of a clear compound-related effect. The overall absence of genotoxicity has been demonstrated in mutagenicity tests with bifenthrin.

In studies with laboratory animals, zeta-cypermethrin did not cause reproductive effects or teratogenicity in laboratory animals. An overall absence of genotoxicity has been demonstrated in tests of mutagenicity, DNA damage and chromosome aberrations.

Chronic exposure to aromatic hydrocarbons may cause headaches, dizziness, loss of sensations or feelings (such as numbness), and liver and kidney damage.

Naphthalene causes cataracts in humans, rats, rabbits and mice. In 2-year inhalation studies conducted by the National Toxicology Program (NTP), there was no evidence of carcinogenic activity of naphthalene in male mice, there was some evidence of carcinogenic activity in female mice and there was clear evidence of carcinogenic activity in male and female rats. Inhalation studies conducted by the International Agency for Research on Cancer (IARC) have found that there is inadequate evidence of carcinogenicity in humans, therefore, IARC has classified naphthalene as a Group 2B (possibly carcinogenic to humans); however, IARC has found that there is sufficient evidence of carcinogenicity in experimental animals.

CARCINOGENICITY:

Chemical Name	IARC	NTP	OSHA	Other
Naphthalene	Listed	Listed	Not listed	(ACGIH) Not listed

12. ECOLOGICAL INFORMATION

No data available for the formulation. Data presented below are based on the active ingredients. The physical and environmental properties, as well as the environmental toxicology of zeta-cypermethrin, are similar to cypermethrin. Unless otherwise indicated, the data presented below pertains to cypermethrin.

ENVIRONMENTAL DATA: Bifenthrin has moderate stability in the soil under aerobic conditions (half-life range from 65 - 125 days depending on soil type) and is stable at a wide range of pH values. Bifenthrin has a high Log Pow (6.6), a high affinity for organic matter, and is not mobile in soil. Therefore, there is little potential for movement into ground water. There is the potential for bifenthrin to bioconcentrate (BCF <2,000).
Cypermethrin is rapidly degraded in soil with a half-life of 2 to 4 weeks. It is readily hydrolyzed under basic conditions (pH = 9), but under acidic and neutral conditions, hydrolysis half-life can be 20 to 29 days. Cypermethrin has a high affinity for organic matter and a Log Pow of 5.0; yet because of the ease with which the material undergoes degradation, it has a very low potential for bioconcentration (BCF = 17) and is not mobile in soil.

ECOTOXICOLOGICAL INFORMATION: Bifenthrin is highly toxic to fish and aquatic arthropods and LC_{50} values range from 0.0038 to 17.8 µg/L. In general, the aquatic arthropods are the most sensitive species. Care should be taken to avoid contamination of the aquatic environment. Bifenthrin had no effect on mollusks at its limit of water solubility. Bifenthrin is only slightly toxic to both waterfowl and upland game birds (LD_{50} values range from 1,800 mg/kg to >2,150 mg/kg).

Zeta-cypermethrin is considered highly toxic to fish and aquatic arthropods and has LC_{50} values which range from 0.002 µg/L to 2.37 µg/L. These values are comparable to cypermethrin. Care should be taken to avoid contamination of the aquatic environment. Cypermethrin is slightly toxic to birds, and oral LD_{50} values are greater than 10,248 mg/kg.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Open dumping or burning of this material or its packaging is prohibited. If spilled material cannot be disposed of by use according to label instructions, an acceptable method of disposal is to incinerate in accordance with local, state and national environmental laws, rules, standards and regulations. However, because acceptable methods of disposal may vary by location and regulatory requirements may change, the appropriate agencies should be contacted prior to disposal.

EMPTY CONTAINER: Non-returnable containers that held this material should be cleaned, prior to disposal, by triple rinsing. Containers which held this material may be cleaned by being triple-rinsed, and recycled, with the rinsate being incinerated. Do not cut or weld metal containers. Vapors that form may create an explosion hazard.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

PACKAGING TYPE:	Non-Bulk
ADDITIONAL INFORMATION:	This chemical is not a hazardous material as defined by US Department of Transportation at 49 CFR Parts 100 through 185.
PACKAGING TYPE:	Bulk
PROPER SHIPPING NAME:	Environmentally hazardous substance, liquid, n.o.s.
TECHNICAL NAME(S):	Bifenthrin, Zeta-cypermethrin
PRIMARY HAZARD CLASS / DIVISION:	9
UN/NA NUMBER:	UN 3082
PACKING GROUP:	III
MARINE POLLUTANT:	Bifenthrin, Zeta-cypermethrin
LABEL(S):	9
PLACARD(S):	9
MARKING(S):	3082
REPORTABLE QUANTITY (RQ):	Naphthalene
ADDITIONAL INFORMATION:	Naphthalene is in an "RQ" quantity when this material meets or exceeds 1,449 pounds (175.43 gallons) per bulk package.

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

PACKAGING TYPE:	Non-Bulk
PROPER SHIPPING NAME:	Environmentally hazardous substance, liquid, n.o.s.
TECHNICAL NAME(S):	Bifenthrin, Zeta-cypermethrin
PRIMARY HAZARD CLASS / DIVISION:	9
UN/NA NUMBER:	UN 3082
PACKING GROUP:	III

MARINE POLLUTANT:	Bifenthrin, Zeta-cypermethrin
LABEL(S):	9
PLACARD(S):	9
MARKING(S):	Environmentally hazardous substance, liquid, n.o.s. (bifenthrin, zeta-cypermethrin), UN3082 + Marine Pollutant
ADDITIONAL INFORMATION:	EmS Number: F-A, S-F

ADR - EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD

PACKAGING TYPE:	Non-Bulk
PROPER SHIPPING NAME:	Environmentally hazardous substance, liquid, n.o.s.
TECHNICAL NAME(S):	Bifenthrin, Zeta-cypermethrin
PRIMARY HAZARD CLASS / DIVISION:	9
CLASSIFICATION CODE:	M6
UN/NA NUMBER:	UN3082
PACKING GROUP:	III
HAZARD IDENTIFICATION NUMBER:	90
MARINE POLLUTANT:	Zeta-cypermethrin
LABEL(S):	9
PLACARD(S):	9
MARKING(S):	UN3082 + Marine Pollutant

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

PACKAGING TYPE:	Non-Bulk
PROPER SHIPPING NAME:	Environmentally hazardous substance, liquid, n.o.s.
TECHNICAL NAME(S):	Bifenthrin, Zeta-cypermethrin
PRIMARY HAZARD CLASS / DIVISION:	9
UN/NA NUMBER:	UN3082
PACKING GROUP:	III
LABEL(S):	9

LIMITED QUANTITY:	Y914 / 30 kg G
LIMITED QUANTITY: PASSENGER / CARGO:	914 / 450 L
LIMITED QUANTITY: CARGO:	914 / 450 L
ADDITIONAL INFORMATION:	This material is not a hazardous material when shipped to, from, or within the USA. Information is shown for shipment to, from, or within those countries requiring "Marine Pollutant" identification when shipped by aircraft. Marks: Environmentally hazardous substance, liquid, n.o.s. (bifenthrin, zeta-cypermethrin), UN3082 + Marine Pollutant

OTHER INFORMATION:

HARMONIZED SYSTEM
Import to the U.S.A.: 3808.91.2500
Export from the U.S.A.: 3808.91.0000

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):
Not listed

SECTION 311 HAZARD CATEGORIES (40 CFR 370):
Immediate, Delayed, Fire

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):
The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.:
None

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):
This product contains the following ingredients subject to Section 313 reporting requirements:
Bifenthrin, Naphthalene

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):
Listed

Chemical Name	RQ	
Naphthalene	100 lb	
Acetic Acid	5,000 lb	Category D

FEDERAL INSECTICIDE FUNGICIDE RODENTICIDE ACT
U.S. EPA Signal Word: CAUTION

INTERNATIONAL LISTINGS

Australian Hazard Code: 3XE

HAZARD, RISK AND SAFETY PHRASE DESCRIPTIONS:

Bifenthrin:

EC Symbols:	T	(Toxic)
	Xn	(Harmful)
	N	(Dangerous for the environment)
EC Risk Phrases:	R25	(Toxic if swallowed.)
	R20	(Harmful by inhalation.)
	R43	(May cause sensitization by skin contact.)
	R50/53	(Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.)
EC Safety Phrases:	S1/2	(Keep locked up and out of reach of children.)
	S23	(Do not breathe gas, fumes, vapor, or spray)
	S24	(Avoid contact with skin.)
	S37	(Wear suitable gloves.)
	S38	(In case of insufficient ventilation, wear suitable respiratory equipment.)
	S45	(In case of accident or if you feel unwell, seek medical advice immediately - show the label where possible.)
	S29	(Do not empty into drains.)

Notes For Preparation:

CLASSIFICATION: Mandatory labeling (self-classification) of hazardous substances: applicable

Aromatic Hydrocarbons, (Index #649-424-00-3):

EC Symbols:	Xn	(Harmful)
EC Risk Phrases:	R65	(Harmful: may cause lung damage if swallowed.)
EC Safety Phrases:	S2	(Keep out of the reach of children.)
	S23	(Do not breathe gas, fumes, vapor, or spray)
	S24	(Avoid contact with skin.)
	S62	(If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.)

Naphthalene, (Index #601-052-00-2):

EC Symbols:	Xn	(Harmful)
	N	(Dangerous for the environment)

EC Risk Phrases:	R22	(Harmful if swallowed.)
	R40	(Possible risks of irreversible effects.)
	R50	(Very toxic to aquatic organisms.)
	R53	(May cause long-term adverse effects in the aquatic environment.)
EC Safety Phrases:	S2	(Keep out of the reach of children.)
	S36/37	(Wear suitable protective clothing and gloves.)
	S46	(If swallowed, seek medical advice immediately and show this container or label.)
	S60	(This material and its container must be disposed of as hazardous waste)
	S61	(Avoid release to the environment. Refer to special instructions/safety data sheets.)

Acetic acid:

EC Symbols:	Xi	(Irritant)
	C	(Corrosive)
EC Risk Phrases:	R10	(Flammable)
	R35/34	(Causes severe burns / causes burns)
	R36/38	(Irritating to eyes and skin.)
EC Safety Phrases:	S1/2	(Keep locked up and out of reach of children.)
	S23	(Do not breathe gas, fumes, vapor, or spray)
	S26	(In case of contact with eyes, rinse immediately with plenty of water and seek medical advice)
	S45	(In case of accident or if you feel unwell, seek medical advice immediately - show the label where possible.)

16. OTHER INFORMATION

REVISION SUMMARY:
This MSDS replaces Revision #2, dated March 22, 2007.
Changes in information are as follows:
Section 14 (Transport Information)
Section 16 (Other Information)

FMC Corporation believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be applicable where such product is used in combination with any other materials or in any process. Use of this product is regulated by the U.S. Environmental Protection Agency (EPA). It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Further, since the conditions and methods of use are beyond the control of FMC Corporation, FMC Corporation expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.