For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident,
Call CHEMTREC Day or Night: 1-800-424-9300.
For Medical Emergencies Only, Call 1-877-325-1840.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Riverdale® Formula® 40
Synonyms: Herbicide mixture of TIPA Salt of 2,4-D and DMA Salt of 2,4-D
EPA Reg. No.: 228-357

Company Name: Nufarm Americas Inc.
1333 Burr Ridge Parkway, Suite 125A
Burr Ridge, IL 60527

Date of Issue: March 2, 2005 **Supersedes:** August 27, 1998
Sections Revised: All - new ANSI format

2. HAZARDS IDENTIFICATION

Emergency Overview:
Appearance and Odor: Amber colored liquid with phenolic odor.
Warning Statements: Keep out of reach of children. DANGER. Corrosive. Causes irreversible eye damage. Combustible; flash point 191°F (88°C) .

Potential Health Effects:
Likely Routes of Exposure: Inhalation, eye and skin contact.
Eye Contact: May cause severe irritation with corneal injury, which may result in permanent impairment of vision, even blindness. Chemical burns may occur.
Skin Contact: Essentially non-irritating to the skin. Skin contact may cause allergic reaction. Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Ingestion: Low toxicity if swallowed. Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.
Inhalation: No adverse effects are anticipated from single exposure to vapor.
Medical Conditions Aggravated by Exposure: Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema or bronchitis. Skin contact may aggravate existing skin disease.

See Section 11: TOXICOLOGICAL INFORMATION for more information

Potential Environmental Effects:
This product is toxic to aquatic invertebrates. Drift or runoff may adversely affect aquatic invertebrates and non-target plants.

See Section 12: ECOLOGICAL INFORMATION for more information

3. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENT	CAS NO.	% BY WEIGHT
Triisopropanolamine Salt of 2,4-Dichlorophenoxyacetic Acid	32341-80-3	34.05
Dimethylamine Salt of 2,4-Dichlorophenoxyacetic Acid	2008-39-1	21.97

Other Ingredients Including:		43.98
Ethylenediamine-tetraacetic acid	60-00-4	
Triisopropanolamine	122-20-3	

4. FIRST AID MEASURES

If in Eyes: Hold eye open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.
If Swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.
If on Skin: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15 to 20 minutes. Call a poison control center or doctor for treatment advice.
If Inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.

5. FIRE FIGHTING MEASURES

Flash Point: 191°F (88°C) Tag Closed Cup
Autoignition Temperature: Not determined **Flammability Limits:** Not determined

Extinguishing Media: Water fog, alcohol foam, CO_2, dry chemical.
Special Fire Fighting Procedures: Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full fire-fighting turn out gear. Dike area to prevent runoff and contamination of water sources. Dispose of fire control water later.
Unusual Fire and Explosion Hazards: If water is used to fight fire, contain runoff, using dikes to prevent contamination of water supplies. Dispose of fire control water later.
Hazardous Decomposition Materials (Under Fire Conditions): Toxic, irritating vapors may be formed if product is involved in fire. Hydrogen chloride, nitrogen oxides, vapors, and gases may be formed under high temperature conditions.

National Fire Protection Association (NFPA) Hazard Rating:
Rating for this product: Health: 3 **Flammability:** 2 **Reactivity:** 0
Hazards Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

6. ACCIDENTIAL RELEASE MEASURES

Personal Precautions: Wear appropriate protective gear for the situation. See Personal Protection information in Section 8.
Environmental Precautions: Prevent material from entering public sewer systems or any waterways. Do not flush to drain. Large spills to soil or similar surfaces may necessitate removal of topsoil. The affected area should be removed and placed in an appropriate container for disposal.
Methods for Containment: Dike spill using absorbent or impervious materials such as earth, sand or clay. Collect and contain contaminated absorbent and dike material for disposal.
Methods for Clean-Up and Disposal: Pump any free liquid into an appropriate closed container. Collect washings for disposal. Decontaminate tools and equipment following cleanup. See Section 13: DISPOSAL CONSIDERATIONS for more information.
Other Information: Large spills may be reportable to the National Response Center (800-424-8802) and to state and/or local agencies.

7. HANDLING AND STORAGE

Handling:
Keep out of reach of children. Causes eye damage and skin irritation. Harmful if swallowed. May cause allergic reaction in susceptible individuals. Avoid contact with eyes, skin and clothing. Users should wash hands before eating, drinking, chewing gum, using tobacco, or using toilet.

Storage:
Do not store below temperature at 40°F (7°C). If frozen (crystallized), warm to 80-90°F (27-32°C) and redissolve before using by rolling or shaking the container. Store in a safe manner. Store in cool, dry place in original container only. Keep container tightly closed when not in use. Reduce stacking height where local condition can affect packaging strength.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls:
Where engineering controls are indicated by specific use conditions or a potential for excessive exposure, use local exhaust ventilation at the point of generation.

Personal Protective Equipment:
Eye/Face Protection: To avoid contact with eyes wear chemical goggles. An emergency eyewash should be readily accessible to the work area.
Skin Protection: To avoid contact with skin, wear long pants, long-sleeved shirt, socks, shoes and chemical-resistant gloves. An emergency shower should be readily accessible to the work area.
Respiratory Protection: Not normally required. If vapors or mists exceed acceptable levels, wear NIOSH approved air-purifying respirator with cartridges/canisters approved for use against pesticides.
General Hygiene Considerations: Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material: 1) Do not store, use and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored. 2) Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics or using the toilet.

Exposure Guidelines:

	OSHA		ACGIH		
Component	TWA	STEL	TWA	STEL	Unit
TIPA Salt of 2,4-D	10*	NE	10*	NE	mg/m^3
DMA Salt of 2,4-D	10*	NE	10*	NE	mg/m^3

*Based on adopted limit for 2,4-D Acid
NE = Not Established

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Amber colored liquid with phenolic odor.

Boiling Point:	>212°F (100°C)	**Solubility in Water:**	Infinite
Density:	Not available	**Specific Gravity:**	1.18 – 1.28 @ 20°C
Evaporation Rate:	Not determined	**Vapor Density:**	Not determined
Freezing Point:	40°F	**Vapor Pressure:**	<1 x 10-7 (non-volatile)
pH:	Not available	**Viscosity:**	Not available

Note: Physical data are typical values, but may vary from sample to sample. A typical value should not be construed as a guaranteed analysis or as a specification.

10. STABILITY AND REACTIVITY

Chemical Stability: This material is stable under normal handling and storage conditions.
Conditions to Avoid: Avoid temperatures near or above flash point (191°F TCC).
Incompatible Materials: Bases, oxidizing materials
Hazardous Decomposition Products: Hydrogen chloride, nitrogen oxides, vapors, and gases may be formed under high temperature conditions.
Hazardous Reactions: Hazardous polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

Toxicological Data:
Data from laboratory studies on this product are summarized below:

Oral: Rat LD_{50}: 866 mg/kg (males) and 1058 mg/kg (females)
Dermal: Rabbit LD_{50}: >2,000 mg/kg
Inhalation: Rat 4-hr LC_{50}: >8.2 mg/L
Eye Irritation: May causes severe irritation with corneal injury.
Skin Irritation: Essentially non-irritating
Skin Sensitization: Not a contact sensitizer in guinea pigs following repeated skin exposure.

Subchronic (Target Organ) Effects: Excessive exposure may cause liver, kidney, gastrointestinal and muscular effects. May cause nausea and vomiting. May cause abdominal discomfort or diarrhea.
Carcinogenicity / Chronic Health Effects: Prolonged over exposure can cause liver, kidney and muscle damage. The International Agency for Research on Cancer (IARC) lists exposure to chlorophenoxy herbicides as a class 2B carcinogen, the category for limited evidence for carcinogenicity in humans. However, more current 2,4-D lifetime feeding studies in rats and mice did not show carcinogenic potential. The U.S. EPA has given 2,4-D a Class D classification (not classifiable as to human carcinogenicity).
Reproductive Toxicity: No impairment of reproductive function attributable to 2,4-D have been noted in laboratory animal studies. Excessive dietary levels of Triisopropanolamine Salt of 2,4-Dichlorophenoxyacetic Acid have caused decreased weight and survival in offspring in a rat reproduction study.
Developmental Toxicity: Studies in laboratory animals with 2,4-D have shown decreased fetal body weights and delayed development in the offspring at doses toxic to mother animals.
Genotoxicity: There have been some positive and some negative studies, but the weight of evidence is that 2,4-D is not mutagenic.

Assessment Carcinogenicity:
This product contains substances that are considered to be probable or suspected human carcinogens as follows:

	Regulatory Agency Listing As Carcinogen			
Component	**ACGIH**	**IARC**	**NTP**	**OSHA**
Chlorophenoxy Herbicides	No	2B	No	No

See Section 2: HAZARDOUS IDENTIFICATION for more information.

12. ECOLOGICAL INFORMATION

This product is toxic to aquatic invertebrates. Drift or runoff may adversely affect aquatic invertebrates and non-target plants. For terrestrial uses, do not apply directly to water, or to areas where surface water

is present to intertidal areas below the mean high water mark. DO not contaminate water when disposing of equipment washwaters.

Most cases of groundwater contamination involving phenoxy herbicides such as 2,4-D have been associated with mixing/loading and disposal sites. Caution should be exercised when handling 2,4-D pesticides at such sites to prevent contamination of groundwater supplies. Use of closed systems for mixing or transferring this pesticide will reduce the probability of spills. Placement of the mixing/loading equipment on an impervious pad to contain spills will help prevent groundwater contamination.

Ecotoxicity:

Data on 2,4-D Dimethylamine Salt

96-hour LC_{50} Bluegill:	524 mg/l
96-hour LC_{50} Rainbow Trout:	250 mg/l
48 hour EC_{50} Daphnia:	184 mg/l
Bobwhite Quail Oral LD_{50}:	500 mg/kg
Mallard Duck 8 day Dietary LC_{50}:	>5620 ppm

Environmental Fate:

In laboratory and field studies, 2,4-D DMA salt and TIPA Salt of 2,4-D both rapidly dissociated to parent acid in the environment. The typical half-life of the resultant 2,4-D acid ranged from a few days to a few weeks.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Pesticide wastes are toxic. Improper disposal of excess pesticide spray mixture, or rinsate is a violation of Federal law and may contaminate groundwater. If these wastes cannot be disposed of by use according to label instructions, contact your state pesticide or environmental control agency, or the hazardous waste representative at the nearest EPA regional office for guidance.

Container Handling and Disposal:

Plastic Containers: Do not reuse container. Triple rinse (or equivalent). Then dispose of in a sanitary landfill, or by incineration, or if allowed by local authorities, by burning. If burned, stay out of smoke.

Metal Containers: Do not reuse container. Triplet rinse (or equivalent). Then offer for recycling or recondition, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Tank Cleaning: Triple rinse (or equivalent) and wash with appropriate cleaners before reusing. Consult Federal, state and local disposal authorities for approved alternative procedures.

14. TRANSPORATION INFORMATION

Follow the precautions indicated in Section 7: HANDLING AND STORAGE of this MSDS.

For Department of Transportation (DOT) regulatory information, if required, consult transportation regulations, product-shipping papers or call Nufarm's DOT Manager at 708-755-2104, Monday through Friday, 8:00 AM to 5:00 PM Central Time.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

TSCA Inventory: This product is exempted from TSCA because it is solely for FIFRA regulated use.

SARA Hazard Notification/Reporting:

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370):

Immediate, Delayed, and Fire

Section 313 Toxic Chemical(s):

Acetic Acid, (2,4-Dichlorophenoxy)- (CAS No. 94-75-7), 36.5% equivalent by weight in product

Reportable Quantity (RQ) under U.S. CERCLA:

Acetic Acid, (2,4-Dichlorophenoxy)- (CAS No. 94-75-7) 100 pounds
Ethylenediamine-tetraacetic acid (EDTA)- (CAS No. 60-00-4) 5000 pounds (2% in product)

RCRA Waste Code:

Acetic Acid, (2,4-Dichlorophenoxy)- (CAS No. 94-75-7) U240

State Information:

Other state regulations may apply. Check individual state requirements.

California Proposition 65: Not listed.

16. OTHER INFORMATION

This Material Safety Data Sheet (MSDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE EPA-ACCEPTED PRODUCT LABELING (attached to and accompanying the product container). This MSDS provides important health, safety and environmental information for employers, employees, emergency responders and others handling large quantities of the product in activities generally other than product use, while the labeling provides that information specifically for product use in the ordinary course.

Use, storage and disposal of pesticide products are regulated by the EPA under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) through the product labeling, and all necessary and appropriate precautionary, use, storage, and disposal information is set forth on that labeling. It is a violation of federal law to use a pesticide product in any manner not prescribed on the EPA-accepted label.

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