ACCEPTED
JUN 1 1978
Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 8655-5

8655-5

Tenox® P

GRAIN PRESERVATIVE

Active Ingredient	Propionic acid	99.5%
Inert Ingredients		0.5%

EPA REG. NO. 8655-5
EPA Est. 8655-TN-1

Marketed by
EASTMAN CHEMICAL PRODUCTS, INC., Kingsport, Tennessee 37662

Made in U.S.A.

KEEP OUT OF REACH OF CHILDREN

DANGER! **CORROSIVE, CAUSES EYE AND SKIN DAMAGE**
COMBUSTIBLE DO NOT USE, POUR, SPILL, OR STORE NEAR HEAT OR OPEN FLAME

Do not get in eyes, on skin, or clothing. Rubber gloves, rubber aprons, and rubber footwear and goggles or face shield should be worn. Avoid breathing vapor; use approved respirator if working near mist or high concentration of vapors. Keep container closed. • Use with adequate ventilation. • Wash thoroughly after handling.

FIRST AID: In case of contact, immediately flush eyes or skin with plently of water for at least 15 minutes while removing clothing and shoes. Call a physician. Wash clothing before reuse.

DIRECTIONS FOR USE — [redacted]

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Bin Preparation As with other blends of acids, Tenox P is corrosive. Bins should be protected by lining with non-toxic plastic sheeting before filling.

Application Tenox P is suggested for application as directed below immediately after harvest to prevent fungal growth in stored corn, milo, barley, wheat, and oats:

Pounds per ton of grain with the following respective percent moisture content

Moisture Content (%)	16	18	20	22	24	26	28	30	32	34	36
Pounds of Tenox P	11	13	15	17	19	21	23	25	27	29	31

[Convert to "fluid oz. per 100 lbs. of grain" by use of the formula: (lbs. product per ton grain) × 0.77 = (fl. oz. product per cwt. grain)]

Apply undiluted, by use of low pressure spray nozzles achieving uniform coverage, as grain passes through applicator. Stop grain flow immediately in event of spray failure or nozzle plugging. Concentrations of untreated grain may develop fungal growth which may spread and spoil all grain in the bin. ONLY GRAIN WHICH IS TO BE USED AS ANIMAL FEED SHOULD BE TREATED since application will reduce grains to Sample Grade and reduce germination. Increasing the suggested rate of application in the Table by 25% for the top 10% of the grain placed in each storage bin will provide additional protection against the effect of normal moisture migration in the grain during storage.

— STORAGE AND DISPOSAL —

STORAGE: Do not contaminate water, feed, or feed by storage or disposal.
PESTICIDE DISPOSAL: Pesticide, spray mixture, or rinsate that cannot be used or chemically processed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies. Open dumping is prohibited.
CONTAINER DISPOSAL: Reseal container and offer for reconditioning, or triple rinse (or equivalent) and offer for recycling, reconditioning, or disposal in approved landfill, or bury in a safe place.
GENERAL: Consult Federal, State or Local disposal authorities for approved alternative procedures.

WARRANTY AND LIMITATION OF LIABILITY

Tenox P Grain Preservative is warranted to conform to the chemical description hereon, and to be reasonably fit for the described use when applied strictly in accordance with directions. THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY OR FITNESS FOR PURPOSE. Factors beyond the control of Eastman Kodak Company and its marketing affiliates prevent them from assuming responsibility for damage to other property, including plants and crops, even when this product is applied according to directions. Buyer and User assume all risks beyond the above warranty. In no event shall the liability of Eastman Kodak Company and its marketing affiliates exceed the purchase price hereof.

LOT NUMBER	D.O.T. SHIPPING NAME	GALLONS	NET WEIGHT
	Propionic acid	53	200 kg • 440 lb
		85	

6-1-1978

Eastman PRODUCTS

FOR THE FOOD, PHARMACEUTICAL, AND AGRICULTURAL INDUSTRIES

Publication No. ZFD-45A

ACCEPTED

JUN 1 1978

Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 8655-5

TENOX® P
Grain Preservative

Tenox P grain preservative is a liquid chemical used to protect high moisture grain from spoilage caused by mold growth while in storage. Grains that may be treated with Tenox P are corn, milo, barley, wheat and oats. Grain that has been treated with Tenox P is used exclusively for livestock feeds. The regulatory status of Tenox P grain preservative is discussed in a subsequent section.

Tenox P grain preservative is propionic acid which is a mild organic acid that is easily digested by livestock. Typical physical properties of Tenox P grain preservative are given on Table 1.

APPLICATION OF GRAIN PRESERVATIVE

Tenox P grain preservative is applied undiluted to freshly harvested grain by means of low-pressure spray nozzles mounted to cover the grain as it passes through an auger-type applicator. Applicators may be rented or purchased from farm supply dealers and have a treating capacity of 900-1,000 bushels per hour.

Table 1

TENOX P Grain Preservative

Typical Properties*

Active Ingredient, Propionic Acid, %	99.5
Inert Ingredient, %	0.5
Molecular Weight	74.09
Wt/Vol, 20°C, lb/gal (U.S.)	8.31
kg/liter	1.00
lb/gal (Imperial)	9.97
Refractive Index, n_D^{25}	1.3850
Viscosity, 25°C, cp	1.16
Vapor Pressure, 20°C, mm Hg	3.0
Heat of Combustion, kcal/g	4.956
Boiling Point, 760 mm, °C (°F)	141.1 (286.0)
Coefficient of Expansion, 20°C	0.001081
Solubility, 25°C, wt %	
in water	Complete
water in	Complete
Freezing Point, °C (°F)	−22.4 (−8.4)
Flash Point (Tag Open Cup), °C (°F)	54 (130)
(Tag Closed Cup), °C (°F)	52 (126)
Fire Point, °C (°F)	58 (137)
Autoignition Temperature, °C (°F)	436 (370
Explosive Limits, mg/l	
Lower	79.8
Upper	339
(Propionic Acid associates in the vapor phase)	
NFPA Code 30, Class	IIIA
DOT Labels Required	Corrosive
DOT Classification	Corrosive material

*These typical properties are reported for information only. Eastman makes no representation that the material in any particular shipment will conform to the listed properties.

EASTMAN CHEMICAL PRODUCTS, INC., Kingsport, Tennessee – United States
EASTMAN CHEMICAL INTERNATIONAL COMPANY, Kingsport, Tennessee – Far East
EASTMAN CHEMICAL INTERNATIONAL A. G., Zug, Switzerland – Europe, Africa, and Middle & Near East
EASTMAN CHEMICAL INTERNATIONAL LTD., Kingsport, Tennessee – Canada, Puerto Rico, Latin America, and Australia & New Zealand
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The amount of grain preservative required for a given weight of grain will depend on the moisture content of the grain. The application rate must be increased as moisture content increases, as illustrated in Table 2 and on the product label (Figure 1). To avoid undertreatment it is essential that at least two moisture readings be taken for each wagon load of grain. The acid application rate should then be based on the highest moisture reading, not the average of the readings.

It is important to remember that freshly harvested grain is alive and respiring. Products of grain respiration are carbon dioxide, additional moisture and energy in the form of heat. The respiration rate of dried grain (13-14% moisture) is very low. Conversely, grain at 24-26% moisture and 70°F is respiring at a high rate, producing additional heat and moisture as end products.

Ideal conditions are that harvested grain should be cleaned (scalped) and cooled to 65°F or lower before acid is applied to the grain. At the recommended levels, with uniform application, Tenox P grain preservative creates a hostile, fungicidal environment for microorganisms naturally present on the grain. Tenox P also kills the germ and other respiring parts of the grain, terminating respiration and the resultant buildup of heat and moisture. (Grain preservative should never be applied to *seed grains* because it kills the embryo, thus preventing germination.)

Like all other acids, Tenox P is corrosive. Bins should be cleaned and protected by lining with nontoxic plastic sheeting before they are filled. Metal, wood and concrete storage structures have been coated with raw linseed oil to reduce corrosion. Corrosion resistant paints are available at farm supply dealers. Eastman makes no recommendations as to the effectiveness or utility of any particular brand of corrosion resistant coating or protective barrier.

EPA REGULATORY STATUS

Tenox P grain preservative has been registered with the Environmental Protection Agency as a fungicide for preserving high-moisture-content grain. The product is available from Eastman in bulk or drum quantities for resale to the agricultural industry.

Storage and Disposal

Drums that have previously contained Tenox P may contain a hazardous residue unless special cleaning and reconditioning procedures are followed in accordance with an EPA Regulation found at 40 CFR 165.9. Empty drums should first be triple rinsed. Drums in good condition may then be returned to the supplier or drum reconditioner for reuse with the same chemical class of pesticide previously contained, provided such reuse is legal under currently applicable U. S. Department of Transportation regulations including those set forth in 49 CFR 173.28. Other rinsed metal containers should be punctured to facilitate drainage prior to transport to a facility for recycle as scrap metal or for disposal. All rinsed containers may be crushed and disposed of by burial in a sanitary landfill, in conformance with State and local standards or buried in the field by the user of the pesticide. Unrinsed containers should be disposed of in a specially designated landfill.

Tenox P must be stored or disposed of in a manner that will prevent contamination of water, food, or feed. Spillage of Tenox P should be neutralized with sodium carbonate, sodium bicarbonate, chalk, or agricultural lime. Unused Tenox P may be disposed of in a landfill approved for pesticides, incinerated, or buried in a safe place away from water supplies. Open dumping is prohibited.

Table 2

Suggested Application Rate[a] for TENOX® P Grain Preservative

Moisture Content, Weight % Moisture in Grain	16	18	20	22	24	26	28	30	32	34	36
Pounds of Tenox P per Ton of Grain	11	13	15	17	19	21	23	25	27	29	31
Fluid oz of Tenox P per cwt. of Grain[b]	8.7	10.3	11.9	13.4	15.0	16.6	18.2	19.8	21.3	22.9	24.5

[a] *Increasing the suggested rate of application in the table by 25% for the top 10% of the grain placed in each storage bin will provide additional protection against the effect of normal moisture migration in the grain during storage.*

[b] *Determined by conversion using the following formula:*

(Pounds of Tenox P per ton of Grain) x 0.79 = (Fluid oz. of Tenox P per cwt. of Grain)

TOXICITY AND HANDLING PRECAUTIONS

Toxicity. Studies on the toxicity of Tenox P have been conducted at the Health, Safety, and Human Factors Laboratory, Eastman Kodak Company, and elsewhere.

This compound is moderately toxic for laboratory animals. The acute oral LD_{50} is greater than 400 mg/kg in rats when administered as a 1% solution in water. The intraperitoneal LD_{50} for rats is 200-400 mg/kg.[1] Other investigators report the acute oral LD_{50} for rats as 4.29 g/kg.[2] Propionic acid is severely irritating to the skin of guinea pigs.[1] The skin LD_{50} for rabbits is 0.5 ml/kg.[2] It is a severe eye irritant capable of causing permanent eye damage.[2] Rats survived exposure for eight hours to concentrated vapor.[2] The vapor is irritating to the eyes, nose, and throat.

Handling and Storing. For equipment mentioned which is not supplied by Eastman, appropriate industrial hygiene and other safety preparations recommended by the manufacture of the material should be followed.

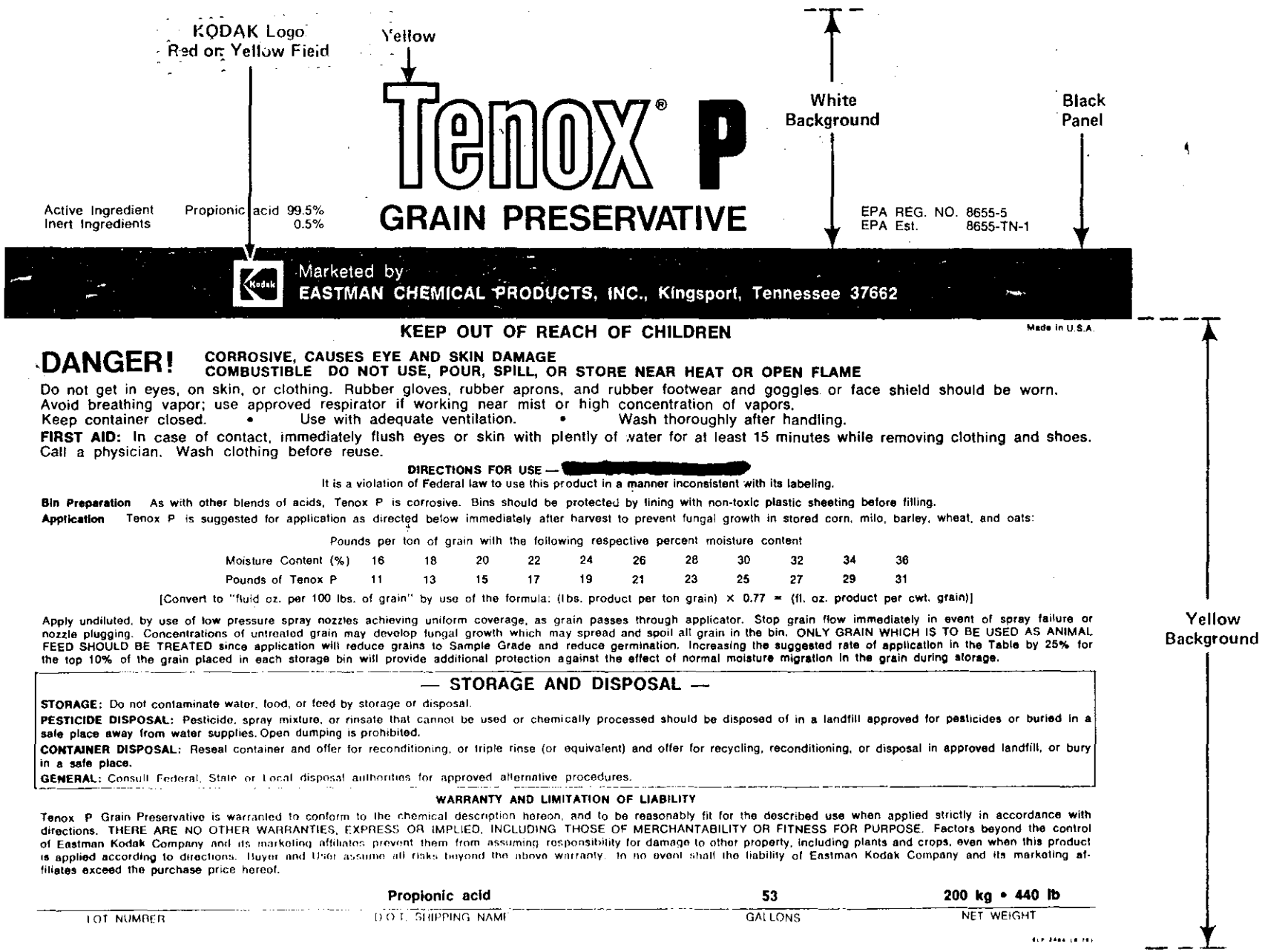
The attached Material Safety Data Sheet provides safety precautions that should be observed in the handling and storing of Tenox P.

References

1. Unpublished data, Health, Safety, and Human Factors Laboratory, Eastman Kodak Company, Rochester, N.Y.
2. Smyth, H. F., et al., Range-Finding Toxicity Data: List VI, Amer. Indust. Hyg. Assoc. J., 23:95, 1962.

Figure 1

Registered Specimen Label



FOR FURTHER INFORMATION

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Publication No. ZFD-45A
May 1978

ECP 3867 (5-78)

Printed in U.S.A.