TO BE USED IN ANIMAL FEED ONLY

AGWAY®

CHEMSTOR®

LIQUID PRESERVATIVE for HIGH MOISTURE CORN, SORGHUM, WHEAT, OATS and BARLEY

FUNGICIDE RODENTICIDE ACT
FOR ECONO. POISON REGISTER-
ED UNDER NO. 8590-437 Comment

ACCEPTED WITH COMMENTS

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CHEMSTOR®

LIQUID PRESERVATIVE for HIGH MOISTURE CORN, SORGHUM, WHEAT, OATS and BARLEY

ACTIVE INGREDIENTS: ORGANIC ACIDS 99% MIN. (19% ACETIC ACID AND 80% PROPIONIC)
INERT INGREDIENTS (WATER) 1% MAX.

DANGER

CAUSES SEVERE BURNS

KEEP OUT OF REACH OF CHILDREN

Do not get liquid or vapor in eyes, on skin, or clothing. [illegible] well ventilated [illegible] not [illegible] [illegible] protective clothing [illegible] of contact, [illegible] skin or eyes with [illegible] for at least 15 minutes; [illegible] attention. After contents have been [illegible], drums should be washed and completely [illegible]. Do not contaminate water by cleaning of equipment, or disposal of wastes. Do not use, pour, spill or store near heat or open flame.

[illegible] TECHNICAL [illegible] AND OTHER CAUTIONS

[illegible] representations in the [illegible], there's [illegible] or condition of ANY [illegible] including NO WARRANTY OF [illegible] material sold [illegible].

Agway Inc. shall have no responsibility, whether for breach of warranty, negligence, or otherwise, for any loss, damage [illegible] to persons or property arising out of the use, storage or handling of Chemstor® otherwise than in strict accordance with the directions contained in the Chemstor® Technical Bulletin.

E.P.A. REG. NO. 8590-437

Manufactured for Agway Inc., Fertilizer-Chemical Division
Box 1333, Syracuse, New York 13201

CHEMSTOR® is a registered trademark of Celanese Corporation.

ACCEPTE[illegible]
September [illegible]
UNDER TH[illegible]
FUNGICIDE [illegible] RODENTICIDE ACT
FOR ECONO. [illegible] POISON REGISTER
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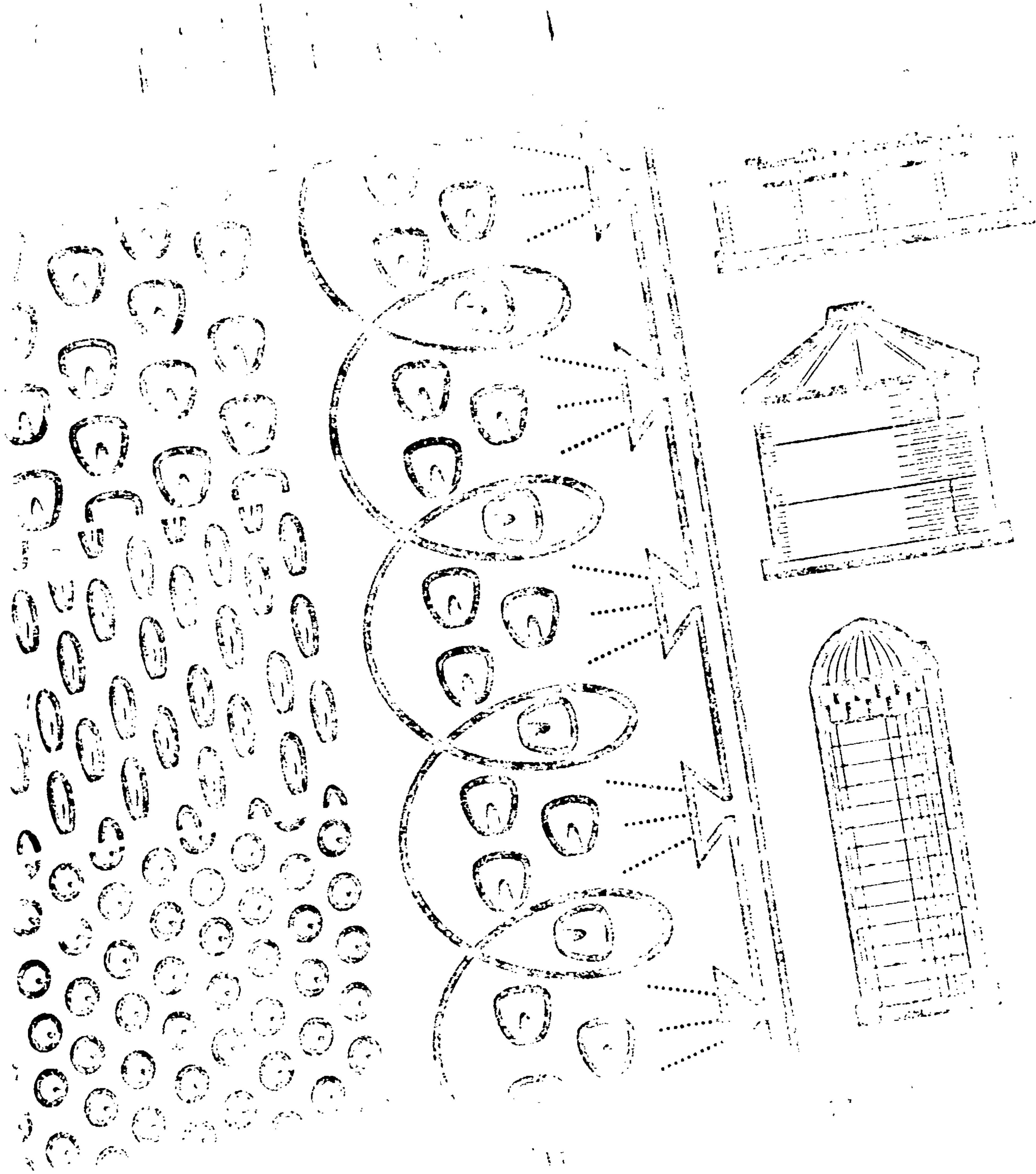
ACCEPTED WITH COMMENTS



ACCEPTED

September 11, 1973

8570-437

ChemStor®

LIQUID GRAIN PRESERVATIVE SYSTEM

TABLE OF CONTENTS

INTRODUCTION

ChemStor* liquid grain preservative is a liquid fungicide developed for use on high moisture whole and ground feed corn, sorghum, wheat oats and barley It is a mild blend of organic acetic and propionic acids-which allows the farmer to store shelled corn and other high moisture cereal grains for animal feeds without drying or the use of air tight silos.

ChemStor* acts as a preservative by preventing the growth of molds and most bacteria in high moisture cereal grains during storage-and is effective for the storage and preservation of both whole and ground cereal grains for animal feeds only

The purpose of this manual, is to provide a basic introduction to the general aspects of liquid preservation of high moisture cereal grains via the ChemStor* system. More comprehensive literature is available on such specific subjects as treatment of grain, storage, and comparative economics.

For further information on these and other subjects, contact your local ChemStor* dealer

IMPORTANT FEEDING NOTE

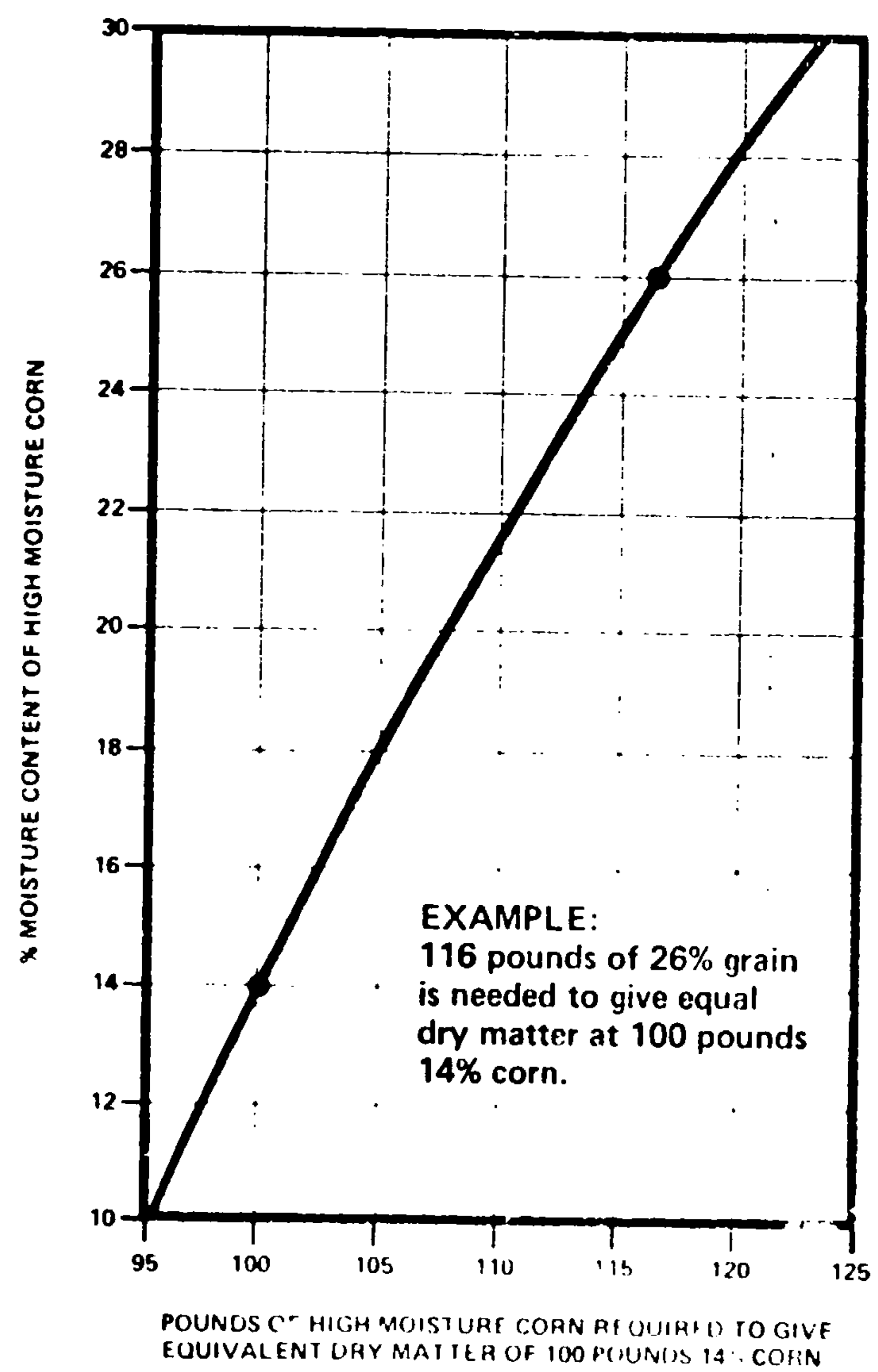
In feeding high moisture grain it is important to account for the additional moisture content when formulating rations for livestock!

For example, *100 pounds of 14% moisture grain will weigh 116 pounds at a moisture content of 26%* See chart below

Thus a ration consisting of 800 pounds of corn at a theoretical 14% moisture level, 150 pounds of roughage and 50 pounds of supplement total 1,000 lbs should be adjusted *upward* to 928 pounds corn (*actual* 26% moisture) with the roughage and supplement rations remaining at 150 and 50 pounds respectively (Adjusted new total weight: 1128 pounds)

When dairy rations are fed on a production basis a similar adjustment for moisture should also be made, to prevent underfeeding

WEIGHT MOISTURE CHART



TYPICAL CHEMSTOR® APPLICATION RATES

GRAIN MOISTURE	[illegible]	[illegible]	[illegible]	[illegible]	23	25	[illegible]	29
CHEMSTOR WT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1 [illegible]	[illegible]	[illegible]

TREATING GRAIN ABOVE THE 29 MOISTURE LEVEL IS GENERALLY NOT RECOMMENDED AS THE COST ADVANTAGES OF CHEMSTOR BEGIN TO DIMINISH BEYOND THAT POINT

The three critical factors involved in properly treating any grain with ChemStor® are

Moisture of grain being treated
The amount of grain being treated per unit of time

These two factors in turn determine the third which is,

Amount of ChemStor® to be applied

The following chart is an easy to use tool in determining the proper amount of ChemStor® to be used in treating grain

Directions:

First of all determine the moisture level of the harvested grain with the Moisture Meter supplied with the system. Locate this percentage on one of the upward angled lines on the chart

Next run a quantity of the grain to be weighed through the auger for ten (10) seconds, and collect it in a suitable container. Weigh this sample. Repeat the run a second time. Average the two results and find this weight on the bottom horizontal scale on chart

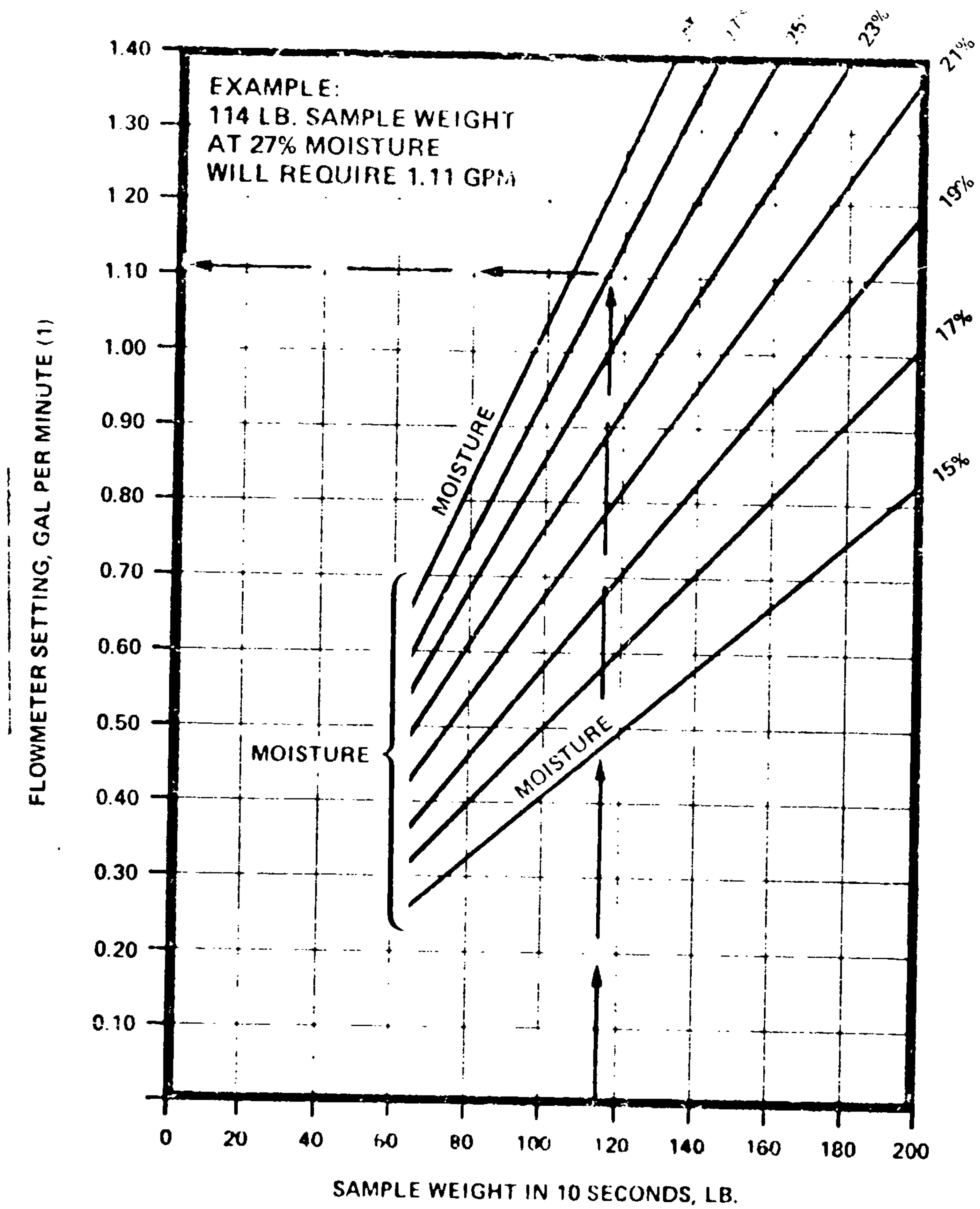
By moving from this weight number straight up to where this imaginary line meets the angled line representing the moisture of the harvested grain and then left to the vertical scale (Flowmeter Setting, Gallons per minute) we arrive at the Flowmeter setting number which will apply the proper amount (flow-rate) of ChemStor®

Example:

Assume a grain harvested with a moisture content of 27% and its weight is 114 pounds per 10 second run through the auger

By locating the 114 pounds on the horizontal (bottom) scale following that line up to the 27% moisture line and then over to the vertical axis we find that the proper flow rate is 1.11 gals/min which is then set on the flowmeter. With this setting you are ready to run your applicator and treat your grain

CHEMSTOR® APPLICATION RATE
FROM 10 SECOND TIMED SAMPLE WEIGHT



(1) Check flowmeter scale and multiply flow rate by 60 if scale reads gallons/hour.

CHEMSTOR® TREATMENT OF GROUND CORN COB AND KERNEL

Many farmers grind cob and kernel for feed to obtain the nutritional value available in the cob. Ground cob and kernel may be successfully treated with ChemStor® liquid preservative if allowance is made for the moisture content of the cob. Mixtures of grain and cob will distort the moisture readings.

The following table and treatment curve have been constructed to provide a ready means of determining the percent of ChemStor® liquid preservative required for treatment of ground cob and kernel.

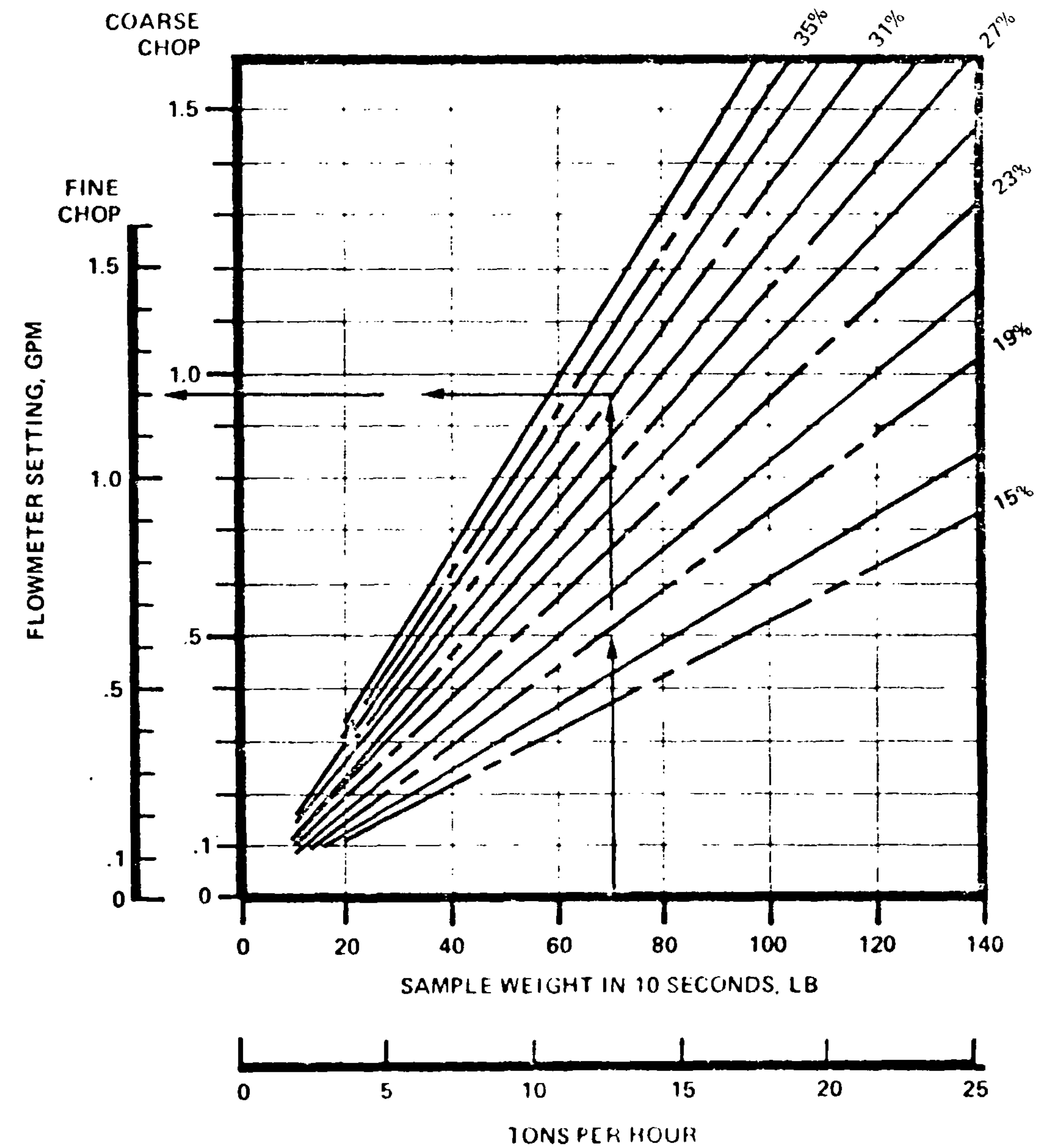
Moisture Content of Kernels Only	Moisture of Cob Only	Moisture of Kernel and Cob Mixture
15.0%	17.5%	15.4%
20.0	32.5	22.5
25.0	44.0	29.0
30.0	52.0	35.1

The ChemStor® treatment level for ground cob and kernels is based on the moisture level of the mixture as calculated. The distribution of ChemStor® liquid preservative must be uniform on both the cob and the kernels.

To determine the ChemStor® treatment level, hand shell several ears to obtain a representative sample of the grain. A moisture determination is made using the ChemStor® portable field moisture meter. Moisture of the kernel and cob mixture may then be read from the curve shown. Use grain only to obtain moisture readings. Once the moisture of the mixture is determined, proceed as outlined under treatment section.

CORN/COB CHOP
CHEMSTOR® APPLICATION RATE

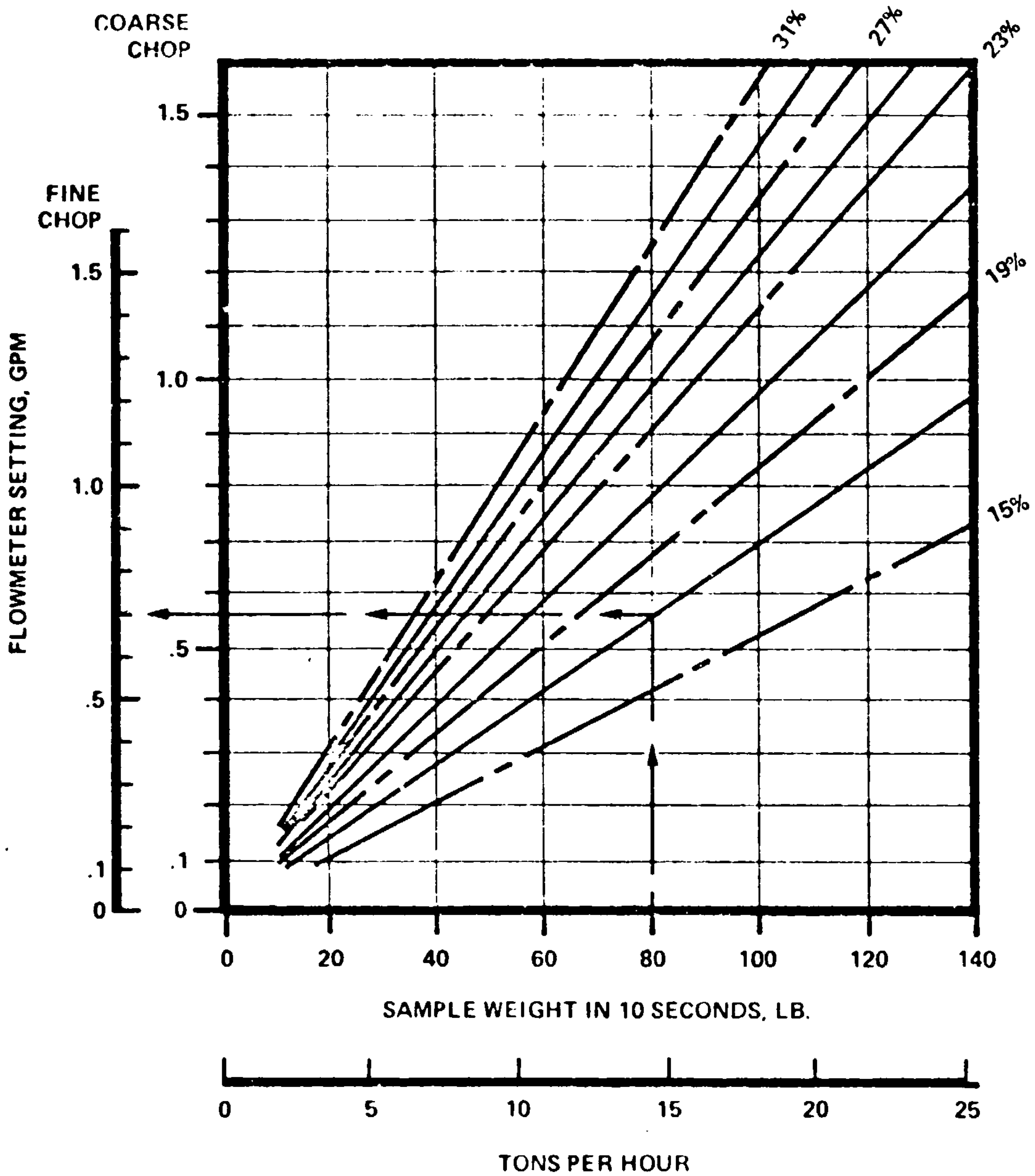
USE THIS CHART WHEN MOISTURE LEVEL OF CHOP MIXTURE IS MEASURED



EXAMPLE: 70 LB SAMPLE WEIGHT IN 10 SECONDS, 31% MOISTURE MEASURED ON THE CHOP MIXTURE. FOR FINE CHOP USE 1.2 GPM. FOR COARSE CHOP USE 0.96 GPM.

CORN/COB CHOP
CHEMSTOR® APPLICATION RATE

USE THIS CHART WHEN MOISTURE LEVEL OF KERNEL GRAIN ONLY IS MEASURED



EXAMPLE: 80 LB SAMPLE WEIGHT IN 10 SECONDS, 17% MOISTURE MEASURED ON THE KERNEL CORN ONLY. FOR FINE CHOP USE .7 GPM; COARSE CHOP .6 GPM

STORING CHEMSTOR® PRESERVED GRAIN

Good harvesting and storage practices should always be followed in the handling treatment, and storage of ChemStor® treated high moisture grain

1 Clean storage area of dirt and old grain

2. Protect metal and concrete surfaces. ChemStor® preservative is a mixture of weak organic acids which will react with metal surfaces causing damage to the metal and sometimes causing the grain at the metal surface to mold. To a lesser extent it also reacts with a concrete surface

3 Know your harvesting machinery and set it properly Clean grain stores better

4 Treat grain as soon as possible after harvesting -- preferably within six hours Mold growth often starts within a few hours after harvest.

5 Do not store ChemStor® treated grain with untreated dry grain, as this can lead to spoilage of untreated grain

6 Level the surface of stored grain in bins to prevent moisture from condensing in the peaks. Leveled grain should not exceed eave height to allow sufficient ventilation space. Leave top surface of stored grain uncovered to prevent sweating

7 Ventilate air space over bin or silo stored grain to prevent sweating by permitting moisture laden air to escape If head space is large enough (for example, a small pile of grain inside a shed) natural ventilation should be adequate Forced ventilation with fans is desirable in enclosed head spaces of bins, silos, covered piles of grain, or large volumes of grain in a shed Size the fan to provide at least one air change every three minutes Suction fans should have aluminum blades and a totally enclosed motor Louvered sections in the roofs of bins, silos and sheds will also aid in ventilating the head space All ventilating systems should be designed to keep rain and snow from entering the storage container

8 Use extra care, because experience has shown that high moisture grain stored at grain temperatures above 60 F is more difficult to preserve than grain stored below 60 F

Early harvest in some areas will result in grain entering storage at higher temperatures

a. Plan your feeding program to feed this grain first, and inspect the grain s temperature with the temperature probe more frequently

b. Avoid storing warm grains in volumes greater than 3000 bushels.

c Cooling, if properly performed, can give improved keeping qualities Where warm grain (greater than 60 -70 F) in quantities greater than 1500 bushels is stored, cooling should be done as follows

d. Start fans only when overnight average temperature drops to 50 F

e. Once fans are started run continuously until grain temperature reaches 55 F Then shut off fan. Measure grain temperature near point where air leaves stored area

NOTE: TO AVOID MOISTURE DEPOSITION ON GRAIN AVOID OVER AERATING

DO NOT AEREATE IN SPRING

9 Inspect grain weekly Observe conditions of the surface and measure internal temperature Notify your dealer immediately if you detect a problem

CHEMSTOR® & STORAGE FACILITIES

1. **Concrete Silos or Bins** To prevent pitting of concrete or cement surfaces, a coating of Devoe's No. 48[illegible]01 Coal Tar Epoxy paint to the floor and lower portions of the wall is recommended. A drain in the bottom is also beneficial.

2. **Galvanized or Steel Bins** Both the treated grain and the vapors from the grain will react with the metal and damage the bin. Some protection is offered by covering the walls with 6-mil polyethylene. Areas exposed to vapors should be coated with coal tar epoxy.

3. **Wooden Bins** A highly recommended form of storage. Any exposed metal surfaces may be protected using coal tar epoxy paint.

4. **Aluminum and Stainless Steel Bins** Need no protection.

5. **Buildings or Quonsets** -- Protect metal walls in contact with grain as outlined above.

6. **Pits and Trenches** Ventilation of head space in pits and trenches is difficult if they are covered with polyethylene. A roof above the pit or trench is desirable as it keeps moisture out and allows proper ventilation. Polyethylene covers restrict air movement and cause moisture condensation. When grain is stored under polyethylene it may be necessary to remove the cover from time to time to ventilate or to force ventilate by drawing air under the cover. All pits should be well drained.

7. **Sheds** -- Open sheds with dirt or concrete floors make good storage. Grain can be stored in piles, wooden bins, paper multiwall bins manufactured by St. Regis Paper Co. or snow fence enclosures under sheds. Snow fence should be lined with aluminum screen wire.

8. **Temporary Storage** -- Treated grain may be temporarily stored for 3 or 4 months in uncovered piles on the ground. Ground should be well drained.

9. **Air-supported Structures** -- Portable or permanent storage covers are available from a number of manufacturers. Many of the coated fabrics from which these covers are made are resistant to ChemStor® preservative and make excellent low-cost storage.

SAFETY AND HANDLING

SAFETY

ChemStor liquid grain preservative is corrosive and causes eye damage and skin burns if improperly handled. Care should be taken to avoid inhaling the vapors, and of course, it should never be swallowed.

Gloves, safety goggles or glasses and aprons should be worn at all times whether handling the preservative, or grain that is still wet from treating. Protective gear should be made of rubber or equivalent impermeable material.

A water supply should be readily available in case of contact.

FIRST AID

ChemStor® liquid preservative will not cause discomfort immediately following contact - and thus does not give quick warning of possible burns. Therefore, speed is essential in removing any ChemStor that has made contact with any unprotected areas. In case of exposure, the following first aid procedures should be followed:

SKIN SPLASH: Immediately flush all exposed areas that were splashed with large quantities of water for at least 15 minutes. A physician should be consulted in case of severe or extensive exposure.

EYE CONTACT: Flush immediately with water for 15 minutes. Get medical attention.

SWALLOWING: If ChemStor® is swallowed, do not attempt to induce vomiting. Wash out mouth with abundant quantities of water, then drink milk mixed with the whites of eggs. If milk and eggs are unavailable, drink as much water as possible. A physician should be called.

CLOTHING: All contaminated clothing should be removed immediately and washed and cleaned separately and thoroughly before being used again.

HANDLING

ELIMINATE ALL SOURCES OF HEAT AND OPEN OPEN FLAME FROM THE TREATING AREA AND STORAGE FACILITY.

Cameraman's Note

Poor Copy

Drums of ChemStor* liquid grain preservative should be handled carefully to avoid undue stress. They should always be stored with the [illegible] upward.

When opening a drum, loosen the drum plug slightly, checking for internal pressure, and then proceed [illegible] slowly to allow any internal pressure to vent. Pressure should never be used to discharge the contents of a drum. After the contents have been removed, drums should be [illegible] and completely drained.

DO NOT ENTER STORAGE FACILITIES WITHOUT ADEQUATE VENTILATION!

DO NOT TREAT CORN OR OTHER CEREAL GRAINS WHICH MIGHT BE USED FOR SEED, MALTING PURPOSES, OR HUMAN CONSUMPTION!

TREATED CORN AND OTHER CEREAL GRAINS ARE TO BE USED FOR ANIMAL FEED ONLY!

Fish and wildlife cautions - DO NOT CONTAMINATE WATER BY DISPOSAL OF WASTE OR WATER USED IN CLEANING EQUIPMENT.

DRUMS NOT TO BE REUSED FOR ANY PRODUCT OTHER THAN CHEMSTOR*.

GENERAL SAFETY POINTERS

Wear rubber soled shoes when treating with ChemStor* as spilled ChemStor* liquid will be absorbed through leather soled shoes and then make contact with skin.

When the applicator is operating, keep hands away from the auger. Avoid wearing loose clothing.

Make sure the electrical system is properly grounded. When using 115 volt power, a 3-wire, grounded system is absolutely required.

When using 230 volt power, the usual 3-wire, grounded neutral system is adequate, but a separate ground wire tied directly to the chassis is recommended.

WARRANTIES

Apart from the representations in this bulletin, there is NO WARRANTY, representation or condition of ANY KIND, expressed or implied, including NO WARRANTY OF MERCHANTABILITY, concerning material sold hereunder or containers in which shipped. Celanese Corporation shall have no responsibility, whether for breach of warranty, negligence, or otherwise, for any loss, damage or injury to persons or property arising out of the use, storage or handling of ChemStor* otherwise than in strict accordance with the directions contained in the ChemStor* Technical Bulletin.

Cameraman's Note
Poor Copy

Capacity:	Marked capacity not over 55 gallons Maximum capacity 58 gallons
Type (Recommended):	Polyethylene drum overpacked in a full removable head steel drum with protruding polyethylene flanges
1. Polyethylene Inner Drum:	One piece molded, virgin polyethylene drum. (Free of any seams or welds.)
DOT Spec:	2 SL - minimum wall thickness 0.040 inches
Dimensions:	Approximately 22-½" dia x 33-9/16" Approximate outside height, including flanges, is 34-7/16"
Material:	Virgin low density polyethylene
Openings:	One 2-inch NPT and one 3/4-inch NPT internal plugged openings. (Flange openings shall be integrally molded part of drum.)
Closures:	One 2-inch NPT and one 3/4-inch NPT polyethylene plugs (Tri-Sure)
Retaining Rings & Gaskets:	1. One 83 MM and one 43 MM I.D. polyethylene retaining rings (1 per flange) 2. Foamed polyethylene retaining ring gaskets
2. Steel Drum Overpack:	Full Removable Head Steel Drum
DOT Specifications:	37 M, NRC
Dimensions:	Inside Dimensions 22-½" dia x 33-5/8" Tolerances ± 1/16" dia; ± 1/8" on height
Materials - Cover:	20 gauge - Cold rolled, low carbon steel
Body:	20 gauge - Cold rolled, low carbon steel
Bottom Head:	20 gauge - Cold rolled, low carbon steel
Locking Ring:	16 gauge, bolted
Flange Openings, Head Top:	3-11/16-inch and 2-½-inch openings in steel head to accommodate protruding flanges of liner

Body Openings:	Two 1/8" drain holes on body near bottom chime and diametrically opposed
Gasket, Top Head:	None required
Finish:	Top and bottom white, body black
Embossed:	Bottom Head - DOT-37M; Manufacturer's symbol; 20/18-55-year of manufacture; month of manufacture; NRC.
Lining:	None
Assembly:	Polyethylene drum inserted in overpack. Bolt ring secured, retaining rings and gaskets secured on protruding flanges. Dust caps placed on flanges. Tamper proof seals - optional.

APPROXIMATE DATA

Weight:	49 pounds (including PE insert)
Height, O.D.:	35-1/8 inches
Diameter, O.D.:	23-11/16 inches
Ocean Shipping Cube:	11/7

Cameraman's Note

Poor Copy

Capacity: Marked capacity not over 55 gallons
Maximum capacity 58 gallons

Type (Recommended): Polyethylene drum overpacked in a full removable head steel drum with protruding polyethylene flanges

1. **Polyethylene Inner Drum:** One piece molded, virgin polyethylene drum. (Free of any seams or welds.)

   DOT Spec: 2 SL - minimum wall thickness 0.040 inches

   Dimensions: Approximately 22-¼" dia x 33-9/16"

   Approximate outside height, including flanges, is 34-7/16"

   Material: Virgin low density polyethylene

   Openings: One 2-inch NPT and one 3/4-inch NPT internal plugged openings. (Flange openings shall be integrally molded part of drum.)

   Closures: One 2-inch NPT and one 3/4-inch NPT polyethylene plugs (Tri-Sure)

   Retaining Rings & Gaskets:
   1. One 83 MM and one 43 MM I.D. polyethylene retaining rings (1 per flange)
   2. Foamed polyethylene retaining ring gaskets

2. **Steel Drum Overpack:** Full Removable Head Steel Drum

   DOT Specifications: 37 M, NRC

   Dimensions: Inside Dimensions 22-½" dia x 33-5/8"
   Tolerances ± 1/16" dia; ± 1/8" on height

   Materials - Cover: 20 gauge - Cold rolled, low carbon steel
   Body: 20 gauge - Cold rolled, low carbon steel
   Bottom Head: 20 gauge - Cold rolled, low carbon steel

   Locking Ring: 16 gauge, bolted

   Flange Openings, Head Top: 3-11/16-inch and 2-½-inch openings in steel head to accommodate protruding flanges of liner

Body Openings: Two 1/8" drain holes on body near bottom chime and diametrically opposed

Gasket, Top Head: None required

Finish: Top and bottom white, body black

Embossed: Bottom Head - DOT-37M; Manufacturer's symbol; 20/18-55-year of manufacture; month of manufacture; NRC.

Lining: None

Assembly: Polyethylene drum inserted in overpack. Bolt ring secured, retaining rings and gaskets secured on protruding flanges. Dust caps placed on flanges. Tamper proof seals - optional.

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Weight: 49 pounds (including PE insert)

Height, O.D.: 35-1/8 inches

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