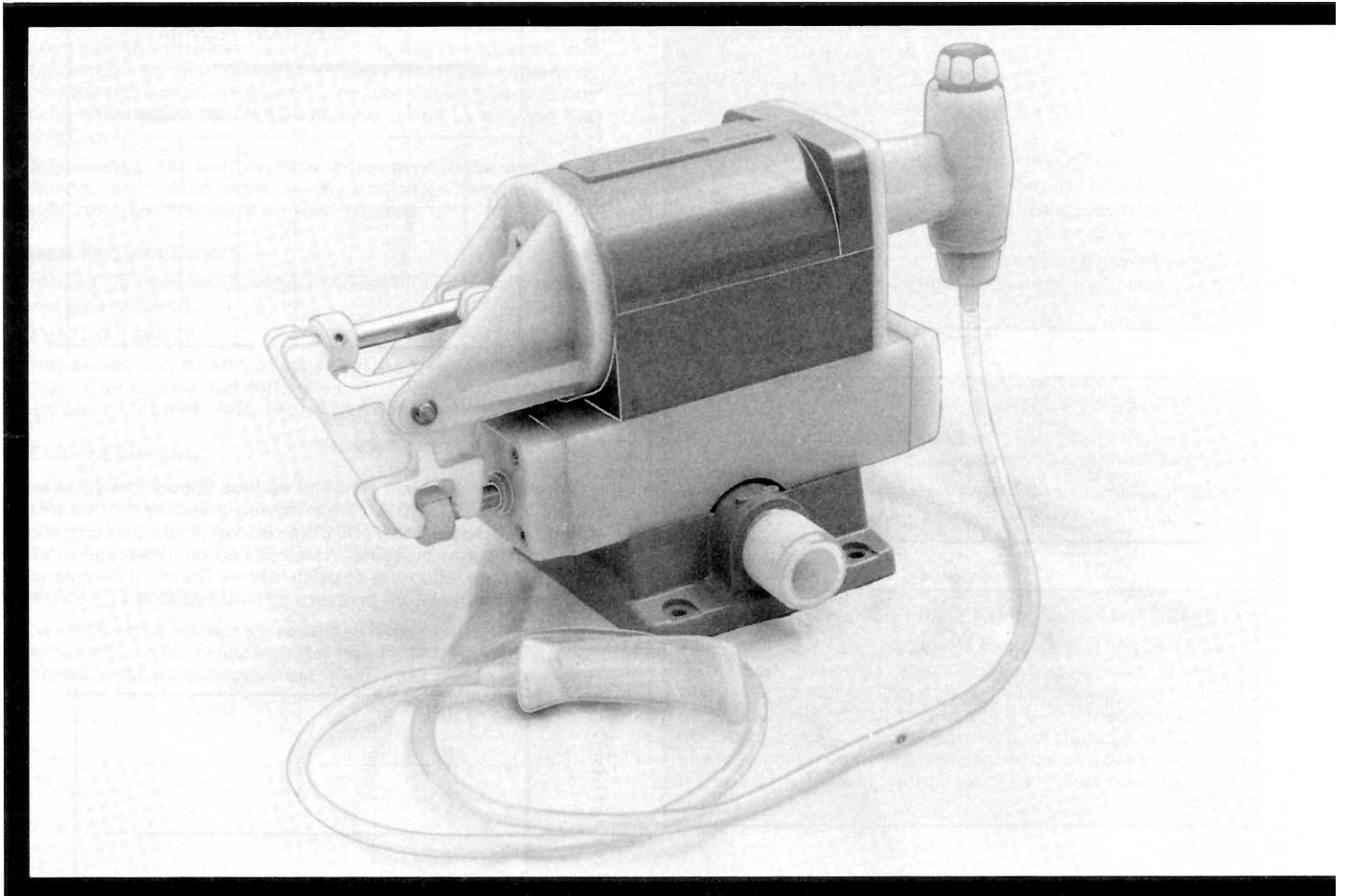


EVALUATION REPORT 372



MERIT COMMANDER LIVESTOCK WATER MEDICATOR

A Co-operative Program Between



MERIT COMMANDER LIVESTOCK WATER MEDICATOR

MANUFACTURER AND DISTRIBUTOR:

Merit Industries Inc.,
P.O. Box 8075
Cranston, RI 02920

RETAIL PRICE: \$248.00 (Date: July, 1984 f.o.b. Cranston, R.I.)

SUMMARY AND CONCLUSIONS:

Overall Performance: Performance of the Merit Commander was very good. It was designed to deliver 1.0 oz/gal (US) (7.8 mL/L)¹. Observed medication ratios were 1.0 oz/gal (US) (7.8 mL/L) at constant flow rates between 0.25 and 1.30 gal (US)/min (1.0 and 5.0 L/min). At fluctuating flow rates between 0.40 and 1.04 gal (US)/min (1.5 and 4.0 L/min), observed medication ratios were 1.0 oz/gal (US) (7.8 mL/L).

Variations of supply line pressures did not greatly affect medication ratio.

Installation and Operation: Ease of Installation and operation was considered good.

Safety and Durability: No safety problems were evident. No durability problems occurred during the test.

Operator Manual: The operator manual was clearly written and contained comprehensive installation and maintenance instructions.

RECOMMENDATIONS

It is recommended the manufacturer consider providing a means of monitoring the flow of medication.

Senior Engineer - G.M. Omichinski

Project Engineer - C. W. Chapman

THE MANUFACTURER STATES THAT

With regard to the recommendation there are two easy means to monitor medication usage. Checking the drop in height of the liquid in the medication container and further for immediate checking to pull the medication tube out of the medication solution for a short portion of suction stroke. In the latter instance, an air pocket can be observed that will move approximately five inches up the tube with each suction stroke.

GENERAL DESCRIPTION

The Merit Commander Medicator is an automatic livestock water medicator designed for installation in a water supply line to provide 1.00 oz/gal (U.S.) (7.8 mL/L) of medication to livestock drinking water. It uses a water driven positive displacement metering piston pump to proportion the medication and a separate medication container. Detailed specifications are given in APPENDIX I.

SCOPE OF TEST²

The performance of the Merit Commander was determined at various pressures and over a wide range of constant and fluctuating flows³, while using a standard medication solution.

In addition, ease of installation and operation, power requirements, safety and suitability of the operator manual were evaluated.

RESULTS AND DISCUSSION

QUALITY OF WORK

Accuracy: Observed medication ratios for constant and fluctuating flow rates are shown in FIGURE 1. Observed medication ratios were the same as the design ratio of 1.0 oz/gal (US) (7.8 mL/L) for all constant and fluctuating flow rates.

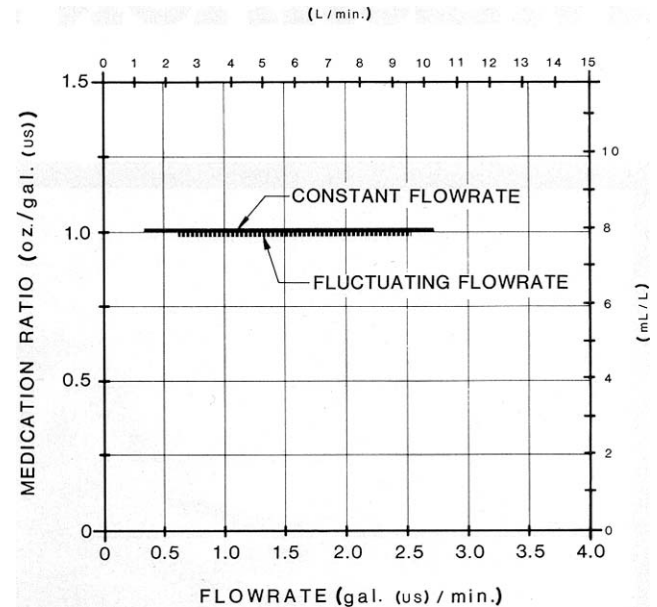


FIGURE 1. Medication ratios vs flow rates.

Observed medication ratios at various supply line pressures are shown in FIGURE 2. Since varying pressure did not affect medication ratios, the Merit Commander would be compatible with typical farm pressure systems. The manufacturer's maximum pressure rating was 85 psi (570 kPa). The Merit Commander operated at a minimum pressure of 3 psi (20 kPa).

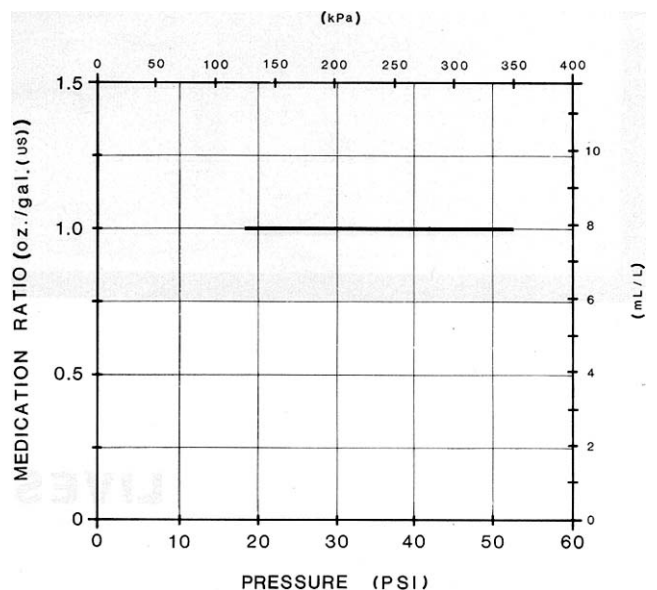


FIGURE 2. Medication ratios vs pressure.

Maximum Flow: The maximum obtainable water flow at 30 psi (205 kPa) through the Merit Commander was 3.4 gal (U.S.)/min (13.0 L/min), when connected to a 33 ft (10 m) length of 0.5 in (12 mm) diameter hose. At this flow rate, the observed ratio was 1.0

¹ A conversion table is provided in APPENDIX IV.

² Prairie Agricultural Machinery Institute Detailed Test Procedure for Livestock Water Medicators.

³ APPENDIX II.

oz/gal (U.S.) (7.8 mL/L). The water driven piston pump caused a cyclic interruption in water flow as the piston changed direction of stroke. This resulted in severe water hammer in the water supply line at high flow rates. An air chamber installed in the water supply line would reduce the severity of the water hammer if high flow rates are expected.

EASE OF INSTALLATION

The Merit Commander was equipped with two standard male hose fittings for installation to the water supply line and 3 ft (1 m) length of plastic tubing, complete with strainer. A medication container was not supplied. The manufacturer recommended that the medicator be installed in a clean, level location which is protected from freezing, the medication container be at the same level as the medicator, and if the water supply contains suspended solids, that a filter be installed in the water supply line.

EASE OF OPERATION

Initial operation of the Merit Commander required a high flow rate to prime the medicator.

Direct monitoring of the medication flow was not possible. It is recommended the manufacturer consider providing a means of monitoring the flow of medication. The medication ratio was not adjustable, however, the ratio could be varied by diluting the medication.

Maintenance: The manufacturer recommended the medicator be flushed with clean water weekly and when removed from service. No other maintenance was required.

POWER REQUIREMENTS

The Merit Commander was water powered and no other power source was required.

OPERATOR SAFETY

The Merit Commander was safe to operate if the manufacturer's recommendations were followed. No safety problems were evident.

OPERATOR MANUAL

The operator manual was well written and illustrated. It contained useful information on installation, operation and maintenance. No medication mixing instructions were included in the manual. A complete parts list was included.

DURABILITY RESULTS

The intent of the test was evaluation of functional performance. An extended durability test was not conducted. No mechanical problems occurred during testing.

APPENDIX I

SPECIFICATIONS

MAKE:	Merit Industries	
MODEL:	Commander	
SERIAL NUMBER:	51835	
DIMENSIONS:		
-- Width	6.4 in	(160 mm)
-- Length	6.6 in	(140 mm)
-- Height	11.0 in	(275 mm)
-- Weight	2.7 lb	(1.22 kg)

WATER LINE CONNECTIONS:

	<u>INLET</u>	<u>OUTLET</u>
-- size	1.0 in (25 mm)	1.0 in (25 mm)
-- type	male hose	male hose

MEDICATION HOSE:

-- length	3.00 ft	(1000 mm)
-- diameter	0.25 in	(6 mm)

APPENDIX II

Fluctuating flows occur when a nipple or water bowl system is used. In the evaluation of livestock medicators fluctuating flows were obtained by continuously cycling three water bowl valves on and off. Reported values for fluctuating flows are the average flows, or the total volume of water delivered divided by the duration (time) of the test.

APPENDIX III

MACHINE RATINGS

The following rating scale is used in Machinery Institute Evaluation Reports:

Excellent	Fair
Very Good	Poor
Good	Unsatisfactory

APPENDIX IV

CONVERSION TABLE

Inches (in) x 2.54	= Millimetres (mm)
Pounds Force/Square Inch (psi) x 6.890	= Kilopascal (kPa)
Gallons (U.S.) x 3.785	= Litres (L)
Gallons (U.S.) x minute x 3.785	= Litres/minute (L/min)
Ounces/gallon (U.S.) x 7.810	= Millilitre/litre (mL/L)



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