January 1920

Test 060: Bates Steel Mule Model D 15-22

Nebraska Tractor Test Lab
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UNIVERSITY OF NEBRASKA
AGRICULTURAL ENGINEERING DEPARTMENT
UNIVERSITY FARM, LINCOLN

Report of Official Tractor Test No. 60

Dates of test August 30 to September 7, 1920.

Name, model and rating of tractor Bates Steel Mule, Model D, 15-22

Serial No. Engine 10783 Serial No. Chassis 4300

Manufacturer Bates Mach. & Tractor Co., Joliet, Ill.

Tractor equipment used Dixie Aero Model Mag.; Bennett Model J Carb.

Style and dimensions of wheel lugs Track-laying type

Brake Horse Power Tests

	Horse Power Developed	Crank Shaft Speed R. P. M.	Length of Test Min.	Fuel Consumption: Kind of Fuel	Fuel Consumption: Amount Used per Hour Gallons	Fuel Consumption: Horse Power Hours per Gallon	Water Consumption Gallons per Hour: In Radiator	Water Consumption Gallons per Hour: In Fuel Mixture	Water Consumption Gallons per Hour: Total	Temperature *Cooling Fluid Deg. F.	Temperature of Atmosphere Deg. F.	Humidity %	Barometric Pressure Inches Mercury
RATED LOAD TEST													
	22.66	1110	120	Kero.	3.18	7.12	0.375	0.00	0.375	206.5	81	64	29.0
			Belt	slippage 0.48%.									
VARYING LOAD TEST													
	22.73	1114	10	Kero.									
	22.89	1088	10	"									
	0.94	1212	10	"									
	6.12	1199	10	"									
	12.13	1182	10	"									
	17.78	1154	10	"									
Aver.	14.12	1160	60	"	2.45	5.77	0.57	0.00	0.57	180	71	90	29.0
MAXIMUM LOAD TEST													
	24.84	1116	60	Kero.	3.76	6.61	0.49	0.00	0.49	192	77.5	83	28.9
			Belt	slippage 0.55%.									
HALF LOAD TEST													
	11.72	1147	60	Kero.	1.89	6.20	0.51	0.00	0.51	178	73	87	28.85
			Belt	slippage 0.25%.									

*Taken in discharge line from engine.

Remarks Kerosene used for fuel in this test weighed 6.72 pounds per gallon.

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Drawbar Horse Power Tests

Horse Power Developed	Draw Bar Pull Pounds	Speed Miles per Hour	Crank Shaft Speed R. P. M.	Slippage of Drive Wheels %	Fuel Consumption			Water Used per Hour Gallons	*Temperature of Cooling Fluid Deg. F.	Temperature of Atmosphere Deg. F.	Average Humidity %	Barometric Pressure Inches Mercury
					ind of Fuel Used	Amount Used per Hour Gallons	Horse Power Hours per Gallon					
RATED LOAD TEST. TEN HOURS												
16.99	2566	2.48	1203	2.6	Kero.	3.11	5.46	0.52	202	74	66	28.8
MAXIMUM LOAD TEST (1st, 102.4' ; 2nd, 104.5')												
20.66	2996	2.59	1158	3.7	Kero.	Not recorded.			180	74	67	28.75
17.79	1910	3.49	1533	1.7	"	"	"	"	170	74	67	28.75

*Taken in discharge line from engine.

Remarks For computing slippage, the outside perimeter of the track was used.

In the rated and first maximum tests the tractor was operated in low gear; in the second maximum test the tractor was operated in high gear.

Oil Consumption:

During the complete test consisting of about 29 hours running the following oil was used:

For the engine, 4 3/4 gallons of Mobiloil B.

For the transmission, gallons of

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Repairs and Adjustments. Endurance:

The governor arm was reversed on this tractor so that the speed range from no load to full load was not so great. This adjustment was made just after the "limbering up" run and before any official data was taken.

At the finish of the rated Drawbar Test the fan bearing became worn and had to be replaced.

At the end of this test the tractor was in good condition and no undue wear was noticeable except the above mentioned bearing.

The above repairs are of only minor importance, and should not disqualify the tractor.

Brief Specifications Bates Steel Mule, 15-22 H.P.:

Motor: Erd, Valve-in-head, vertical, 4 cylinder. Bore 4¼", Stroke 6". Rated speed 1100 r.p.m.

Chassis: 2 wheels, 2 tracks. Borg and Beck clutch. Rated speeds, Low - 3 miles per hour; High - 4.5 miles per hour.

Total weight, 4,600 lbs.

General Remarks:

During the "limbering up" run this tractor was operated in mud for about 8 hours, pulling about ¾ load.

In the advertising literature submitted with the application for test of this tractor we find some statements and claims which cannot be directly compared with the results of this test as reported above. It is our opinion that none of these are excessive or unreasonable except the following:

"End of Search", page 5: 'The Bates Steel Mule is the most efficient tractor in America today, barring none.'

"Exhibit B: 'The Bates Steel Mule will always work equally well in dry or wet soil, good or bad conditions.'

"Exhibit D: 'The Bates Steel Mule is a perfect field machine".

We, the undersigned, certify that above is a true and correct report of official tractor test No. 60.

Fred R Mohawec
Engineer-in-Charge

Oscar W. Jogren
E. E. Brackett
C. W. Smith
Board of Tractor Test Engineers.