January 1920

Test 068: Bates Steel Mule Model F 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. 68

Dates of test October 12 to October 18, 1920.

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

Serial No. Engine 10048 Serial No. Chassis 5100

Manufacturer Bates Machine & Tractor Co., Joliet, Illinois.

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

Style and dimensions of wheel lugs Track-laying type drivers, no lugs.

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												
22.20	1112	120	Gaso.	3.006	7.39	0.05	0.342	0.392	161	69	87	28.5
		Belt slippage 0.41%.										
VARYING LOAD TEST												
22.30	1117	10	Gaso.									
22.50	1101	"	"									
0.76	1118	"	"									
5.67	1136	"	"									
11.30	1132	"	"									
15.90	1061	"	"									
Aver. 13.18	1111	60	Gaso.	2.426	5.43	0.076	0.000	0.076	151	69	87	28.5
MAXIMUM LOAD TEST												
29.78	1108	60	Gaso.	3.588	8.30	0.09	0.33	0.42	187	73	62	28.9
			Belt slippage 0.70%.									
HALF LOAD TEST												
11.13	1112	60	Gaso.	1.951	5.71	0.06	0.00	0.06	154	74	87	28.5
			Belt slippage 0.18%.									

*Taken in discharge line from engine.

Remarks The gasoline used in these tests weighed 6.22 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												
16.17	2558	2.37	1130	2.67	Gaso.	2.665	6.07	0.19	179	69	77	28.6
MAXIMUM LOAD TEST (1st 118.5 ft--2nd 126.2ft.)												
23.19	3100	2.81	1185	8.28	Gaso.	Not	Recorded		174	68	80	28.5
22.98	2103	4.10	1098	2.32	"	"	"	"	194	68	80	28.5

*Taken in discharge line from engine.

Remarks ** For computing slippage the outside length was used. This measurement was made by marking point on track and then revolving it slowly.

For the rated and first maximum tests the tractor was operated in low gear. The second maximum test was run in high gear.

Oil Consumption:

During the complete test consisting of about 32 hours running the following oil was used:

For the engine, 4½ gallons of Mobiloil BB

For the transmission, 1/4 gallons of Mobiloil C (1.74# grease)

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Repairs and Adjustments. Endurance:

After about 15 hours of running the tube to oil pressure gage was replaced by a longer one, having a coil in it; also spring in oil-control plunger was replaced.

No other repairs or adjustments were necessary during this test.

As the tractor was operating in good condition at end of test, it is our opinion that the above repairs are of only minor importance, and do not indicate any serious mechanical defect.

Brief Specifications:

Motor: Midwest, 4 cylinder, valve-in-head, vertical, Bore 4-1/8" Stroke 5½". Rated speed, 1100 r.p.m. Rated H.P. belt 22, drawbar 12.

Chassis: two track layers, two front wheels. Borg and Beck clutch. Rated speeds low 3, high 4.5 miles per hour.

Total Weight: 4,600#.

General Remarks:

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

End of Search, page 5: "The Bates Mule is the most efficient tractor in America, 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. 68.

Fred R. Mohaven
Engineer-in-Charge

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