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January 1931

## Test 187: Bates Steel Mule Model 45

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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UNIVERSITY OF NEBRASKA - AGRICULTURAL ENGINEERING DEPARTMENT  
AGRICULTURAL COLLEGE, LINCOLN

Copy of Report of Official Tractor Test No. 187

Dates of test: April 8 to 28, 1931.

Name and model of tractor: BATES STEEL MULE "45"

Manufacturer: Foote Bros. Gear and Machine Co., Chicago, Ill.

Manufacturer's rating: Drawbar - 45 H.P. Belt - 55 H.P.

Highest rating permissible under the recommendations of the A.S.A.E. and

S.A.E. Tractor Rating Codes: Drawbar - 40.07 H.P. Belt - 60.38 H.P.

One carburetor setting (100% of maximum) was used thruout this test.

B R A K E H O R S E P O W E R T E S T S

H.P.	:Crank : :shaft :	Fuel Consumption	: Water consumption : : per hour gallons :	Temp. : : Deg. F. :	:Barometer
	:speed : :R.P.M.:	Gals. : per :	H. P. : :hrs. @ :	:Cool- : : fuel : : Total :	:Inches of : Air:Mercury
	: : : hour :	:gal. : :hour :	: : : : :	: : : med. : :	: : : : :

OPERATING MAXIMUM LOAD TEST. ONE HOUR

66.53	:	1501	:	7.815	:	8.51	:	0.713	:	0.00	:	0.00	:	0.00	:	192	:	91	:	28.855
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RATED LOAD TEST. ONE HOUR

55.60	:	1501	:	6.834	:	8.14	:	0.746	:	0.00	:	0.00	:	0.00	:	174	:	78	:	28.875
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\*VARYING LOAD TEST. TWO HOURS

55.77	:	1500	:	6.776	:	8.23	:	0.737	:	--	:	--	:	--	:	176	:	79	:	--
0.86	:	1645	:	2.906	:	0.30	:	20.512	:	--	:	--	:	--	:	184	:	81	:	--
28.66	:	1539	:	4.750	:	6.03	:	1.006	:	--	:	--	:	--	:	185	:	80	:	--
64.43	:	1488	:	7.374	:	8.74	:	0.695	:	--	:	--	:	--	:	177	:	78	:	--
14.91	:	1594	:	3.890	:	3.83	:	1.583	:	--	:	--	:	--	:	178	:	79	:	--
42.49	:	1523	:	5.817	:	7.30	:	0.831	:	--	:	--	:	--	:	180	:	81	:	--
35.46	:	1547	:	5.252	:	6.75	:	0.899	:	0.00	:	0.00	:	0.00	:	180	:	79	:	28.800

\*20 minute runs. Last line is average for two hours.

D R A W B A R H O R S E P O W E R T E S T S

H.P.	: Draw : : Bar :	Speed : : miles :	:Crank : :shaft :	Slip : : on :	: Fuel Consumption : : H.P. : : Lbs.:	: Water: : : used : : Gal. :	Temp. : : : : H.P.:	: : : : : per :	:Barometer
	: pull : : pounds:	: per : : hour :	:speed : :R.P.M.:	: drive: : : wheels:	: Gal. : : per :	: hr. : : per :	: per : : H.P.:	: Cool-: : : Air : : ing :	:Inches of : Mercury
	: : : : :	: : : : :	: : : : :	: % : : hour :	: gal. : : hour :	: hour : : hour :	: hour : : hour :	: med. : : : :	: : : : :

RATED LOAD TEST. TEN HOURS. Intermediate Gear.

45.12	:	5482	:	3.09	:	1504	:	1.07	:	6.691	:	6.74	:	0.896	:	0.067	:	181	:	75	:	28.940
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MAXIMUM LOAD TEST

54.43	:	10312	:	1.98	:	1497	:	3.68	:	-----	:	Not Recorded	:	-----	:	183	:	46	:	29.120
52.22	:	6371	:	3.07	:	1500	:	1.30	:	-----	:	"	:	-----	:	181	:	55	:	29.120
49.63	:	4547	:	4.09	:	1500	:	0.79	:	-----	:	"	:	-----	:	177	:	59	:	29.130

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Copy of Report of Official Tractor Test No. 187

BRIEF SPECIFICATIONS

MOTOR: Make Waukesha Serial No. 273044 Type 6 Cylinder Vertical  
Head L Mounting Lengthwise  
Bore and stroke: 4 5/8 x 5 1/8 in. Rated R.P.M. 1500  
Port Dia. Valves: Inlet 1 5/8" Exhaust 1 3/8"  
Belt pulley: Diam. 12 in. Face 9 in. R.P.M. 920  
Magneto: American Bosch Model U6  
Carburetor: Schebler Model HDX Size 1 1/2"  
Governor: Waukesha No. None Type Centrifugal  
Air Cleaner: Vortex Type Oil spray and steel wool  
Lubrication: Pressure Feed

CHASSIS: Type Tracklayer Serial No. 456001 Drive Enclosed gear  
Clutch: Twin Disc Type Dry double plate operated by hand  
Advertised speeds, miles per hour: Low 1.92  
Intermediate 2.92 High 3.87 Reverse 1.40  
Tracks: Length 20.5 ft. Face 14"  
Lugs: Type Cleats cast with shoe No. per track 41 Size 14" long x 2" high  
Extension rims: None  
Seat Upholstered  
Total weight as tested (with operator) 13509 pounds.

FUEL AND OIL:  
Fuel: Gasoline Weight per gallon 6.07 pounds on belt tests  
6.04 pounds on drawbar tests  
Oil: S. A. E. Viscosity No. 40  
Total oil to motor 4.221 gallons  
Total drained from motor 1.055 gallons  
Total time motor was operated 55 Hours

The oil was drained  
from the crankcase  
once - at the end  
of the test.

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REPAIRS AND ADJUSTMENTS

After 15 hours operation a leak was discovered at the connection between the oil line and the pressure gauge. The connection was tightened and the leak stopped. Four quarts of oil had been added prior to this time.

REMARKS

At the end of the rated drawbar test, oil was dripping from the clutch housing indicating that oil from the crankcase was leaking out through the rear main bearing.

The tests herein reported were conducted with one carburetor setting which remained unchanged thruout the tests. This condition should be recognized when comparing this test with any Nebraska test conducted prior to 1928.

The track and lug equipment used in the drawbar tests is the same as that described on page 2 of this report.

In the advertising literature submitted with the specifications and application for test of this tractor we find that in Form BSF201 the rated motor speed is specified as 1400 r.p.m. instead of 1500 r.p.m. as used in this test.

We, the undersigned, certify that the above is a true and correct report of official tractor test No. 187.

Carlton L. Zink  
Engineer -in-charge

E. E. Brackett

C. W. Smith

E. B. Lewis  
Board of Tractor Test Engineers