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January 1920

Test 020: Emerson-Brantingham 12-20

Nebraska Tractor Test Lab

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UNIVERSITY OF NEBRASKA
AGRICULTURAL ENGINEERING DEPARTMENT
UNIVERSITY FARM, LINCOLN

Report of Official Tractor Test No. 20

Dates of test August 27 to September 3, 1920

Name, model and rating of tractor Emerson-Brantingham 12-20

Serial No. Engine 59835 Serial No. Chassis 33815 - D

Manufacturer Emerson-Brantingham Co., Rockford, Illinois.

Tractor equipment used " KW Model "TK Mag.;" Stromberg Model "M-3 Carb.

Style and dimensions of wheel lugs Spade 4" high x 3" x 2".

Brake Horse Power Tests

Horse Power Developed	Crank Shaft Speed R. P. M.	Length of Test Min.	Fuel Consumption			Water Consumption Gallons per Hour			Temperature *Cooling Fluid Deg. F.	Temperature of Atmosphere Deg. F.	Humidity %	Barometric Pressure Inches Mercury
			Kind of Fuel	Amount Used per Hour Gallons	Horse Power Hours per Gallon	In Radiator	In Fuel Mixture	Total				
RATED LOAD TEST												
20.27	906	120	Kero.	2.40	8.45	0.125	0.000	0.125	202	78.5	73	28.7
			Belt slippage 1.87%.									
VARYING LOAD TEST												
20.42	910	10	Kero.									
20.66	905	"	"									
20.93	926	"	"									
5.17	935	"	"									
10.41	941	"	"									
15.97	937	"	"									
12.50	926	60	Kero.	1.85	6.74	0.125	0.00	0.125	179	86	58	28.7
MAXIMUM LOAD TEST												
25.90	915.5	60	Kero.	3.53	7.29	2.50	0.00	2.50	212	90	50	28.7
27.30	915	110	Gasol.			Belt slippage 1.74%.						
HALF LOAD TEST												
10.43	943	60	Kero.	1.74	6.00	0.00	0.00	0.00	168	88	58	28.7
			Belt slippage 1.15%									

*Taken in discharge line from engine.

Remarks The kerosene used for this test weighed 6.72# 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												
15.54	2037	2.86	944	6.76	Kero.	2.71	5.73	0.025	180	69	86	28.9
MAXIMUM LOAD TEST												
17.16	2368	2.72	894	10.2	Kero.	Not	Recorded		194	88	58	28.8
17.55	3022	2.18	931	10.4	"	"	"		190	87	58	28.8

*Taken in discharge line from engine.

Remarks For computing slippage, the circumference of the drive wheels was taken at points of lugs.
 During the rated and first maximum test the tractor was operated in high gear; during the second maximum test the tractor was operated in low gear.

Oil Consumption:

During the complete test consisting of about 30 hours running the following oil was used:

For the engine, 3 1/4 gallons of Veedol Heavy and 3 gallons Mobiloil B

For the transmission, 1/2 gallons of 600-W

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Repairs and Adjustments. Endurance:

After about 16 hours of running the valve timing was checked, and camshaft advanced about 18 degrees, also new spark plugs put in.

At this time the radiator was changed and water circulation inspected, on account of motor heating.

After about 20 hours of running the piston rings were examined and found to be abutting and repaired.

The cylinder heads cracked and were replaced, and new gaskets put in.

After a complete test was made, the fan was found to be smaller than standard size and was replaced by one of standard size; e.i., 20 $\frac{1}{4}$ inches in diameter, and the tractor was retested because the small fan allowed motor to heat excessively.

At the end of the test there were no indications of undue wear or that any part might require early repair.

It is our opinion that the above repairs and adjustments do not indicate any mechanical defect so serious as to disqualify the tractor.

Brief Specifications:

Motor: Own, 4 cylinder, L-head, vertical. Bore 4 $\frac{3}{4}$ ", stroke 5". Rated speed 900 r.p.m. Rated horse-power - Belt 20, Drawbar 12. Cooling fan 20 $\frac{1}{4}$ " O.D.

Chassis: 4 wheel, cone clutch. Rated speeds: low 2.1, high 2.77 miles per hour.

Total Weight: 4,400 lbs.

General Remarks:

In the advertising literature submitted with the applications for test of this tractor, we find some statements and claims that 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.

We, the undersigned, certify that above is a true and correct report of official tractor test No. 20.

Fred R. Nohaver
Engineer-in-Charge

Oscar W. Sjogren
E. E. Brackett
E. W. Smith

Board of Tractor Test Engineers.