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January 1923

Test 096: Avery 20-35

Nebraska Tractor Test Lab

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UNIVERSITY FARM, LINCOLN
AGRICULTURAL ENGINEERING DEPARTMENT
 UNIVERSITY FARM, LINCOLN

Report of Official Tractor Test No. 96

Dates of test June 24th to July 2nd, 1923

Name, model and rating of tractor Avery 20 - 35

Serial No. Engine A. M. 149 Serial No. Chassis 28110

Manufacturer Avery Company, Peoria, IL

Tractor equipment used K. W. Model T. K. 0-104283 Mag. Kingston E Double Carb.

Style and dimensions of wheel lugs Angle 3" x 3" x 28" - 18 on each drive wheel.
8" on extension rims.

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 of Cooling Fluid Deg. F.	Temperature of Atmosphere Deg. F.	Humidity %	Barometric Pressure Inches Mercury
			Kind of Fuel	Amount Used per Hour Gallon	Horse Power per Gallon	In Radiator	In Fuel Mixture	Total				
RATED LOAD TEST.												
35.34	900	120	Kero	3.893	9.07	0.070	0.000	0.070	187	87	75	28.43
Belt slippage 1.54%												
VARYING LOAD TEST ***												
35.41	899.5	10	Kero									
35.90	897.0	10	"									
1.44	946.0	10	"									
9.31	943.0	10	"									
18.43	933.5	10	"									
27.18	920.5	10	"									
21.53	921.0	60	"	3.009	7.15	0.00	0.00	0.00	181	72	48	28.75
MAXIMUM LOAD TEST												
37.33	893	60	Kero	6.702	5.57	0.187	0.00	0.187	150	72	56	29.04
Belt slippage 1.47%												
HALF LOAD TEST												
18.36	931	60	Kero	2.618	7.01	0.00	0.00	0.00	186	78	48	28.53
Belt slippage 1.11%												

*Taken in discharge line from auger.

***The last line is an average for the hour.

Remarks The kerosene used as fuel in this test weighed 6.78 pounds per gallon.

Report of Official Tractor Test No. _____

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 Air Intake Deg. F	Average Humidity %	Barometric Pressure Inches Mercury
					Kind of Fuel Used	Amount Used per Hour Gallons	Horse Power Hours per Gallon					
RATED LOAD TEST. TEN HOURS												
19.82	2532	2.94	910	$\frac{11.11}{2.22}$	Kero	5.174	3.83	0.539	164	83	55	28.95
MAXIMUM LOAD TEST												
22.62	3080	2.75	854	$\frac{11.64}{2.82}$	Kero	--- Not recorded ---			156	78	47	28.82
18.52	1810	3.84	754	$\frac{9.32}{0.03}$	"	"	"	"	166	78	40	28.90

*Taken in discharge line from engine.

***The horsepower is slightly below rating because operator failed to apply sufficient load.

Remarks — The first figure denotes slippage at the points of lugs. The second figure denotes slippage of the rim of the wheel. The rated load and the first maximum runs were made in low gear. The second maximum test was made in high gear.

Oil Consumption:

During the complete test consisting of about 40 hours running the following oil was used:

For the engine, 12 gallons of Mobiloil "B" ($1\frac{1}{2}$ gal. to fill crankcase, $10\frac{1}{2}$ added to lubricator).

For the transmission, $1\frac{1}{2}$ gallons of 600 W and 2 lbs of cup grease

Copy of Report of Official Tractor Test No. 96

The following is a statement of all repairs and adjustments made on the tractor during the complete test. Also report on endurance.

June 26: While on preliminary belt test push rods on cylinders No. 2 and 4 were adjusted. Lock nuts had worked loose.

June 27: Before any data were taken both valve springs on cylinder No. 4 and exhaust valve spring on cylinder No. 3 were found broken and replaced.

June 28: Push rod on cylinder No. 1 adjusted. Replaced broken bolt in lubricator support. Ground exhaust valves on cylinders No. 3 and No. 4.

July 3: After the test was completed intake valve spring on cylinder No. 4 was found broken and replaced. The water discharge connection to front cylinders was found to be leaking and tightened. Otherwise the tractor was in good working order and there was no indication of excessive wear nor that any part might require early repair.

Brief Specifications: Avery 20-35.

Motor: Own, 4 cylinder opposed, horizontal, removable cylinder sleeves. Bore 4-7/8", stroke 7", rated speed 900 r.p.m.

Chassis: Four wheel, shoe clutch. Two speeds, low gear 3 miles per hours, high gear 4 miles per hour.

Total weight 7550 pounds.

Copy of Report of Official Tractor Test No. 96.

General Remarks:

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

Exhibit "B". Avery general catalog (issued in 1921).

Page 21: Avery 8-16 and Avery 12-25.

"Fuel: Kerosene, distillate or gasoline."

When tested here in 1921 it was necessary to operate these tractors on gasoline to make the horse power ratings claimed.

Page 21: Avery 18-36.

"Bore and stroke, inches, $5\frac{1}{2}$ x 6".

"R.P.M. minimum and maximum 550-750".

The specifications submitted with this tractor when tested here in 1920 give:

Bore $5\frac{1}{2}$ " - Stroke 7".

R.P.M. of crankshaft 700 - 800.

Page 21: Avery 25-50.

"Bore and stroke, inches $6\frac{1}{2}$ x 7".

The specifications submitted with this tractor when tested here in 1920 give:

Bore $6\frac{1}{2}$ inches. Stroke 8 inches.

Page 25: "It is perfectly balanced -----".

"It has a better water space for cooling than a vertical motor."

Exhibit "E". 1923 Avery line folder.

Page 3: Brief specifications of Avery "Track-Runner".

"Burns gasoline, kerosene or distillate."

Specifications submitted with application for the test of the "Track-Runner" specify operation on gasoline only and the test was made using gasoline for fuel.

We, the undersigned, certify that above is a true and correct report of official tractor test No. 96.

E. E. Brackett
Engineer-in-Charge

Oscar W. Sjogren

C. W. Smith

Fred R. Nohavec
Board of Tractor Test Engineers