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Test 481: Case LA

Nebraska Tractor Test Lab

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The Experiment Station
University of Nebraska College of Agriculture
W. V. Lambert, Director, Lincoln, Nebraska

Department of Agricultural Engineering
Dates of test: August 18 to August 29, 1952
Manufacturer: J. I. CASE COMPANY, RACINE,
WISCONSIN
Manufacturer's rating: Not rated.

NEBRASKA TRACTOR TEST NO. 481

CASE LA

BELT HORSEPOWER TESTS

Hp	Crank shaft speed rpm	Fuel Consumption			Water used gal per hour	Temp Deg F		Barometer inches of mercury
		Gal per hour	Hp-hr per gal	Lb per hp-hour		Cooling med	Air	
TEST B—100% MAXIMUM LOAD—TWO HOURS								
48.86	1150	5.038	9.70	0.684	0.00	161	66	29.100
TEST C—OPERATING MAXIMUM LOAD—ONE HOUR								
46.61	1150	4.332	10.76	0.617	0.00	163	63	29.120
TEST D—RATED LOAD—ONE HOUR								
43.05	1151	4.069	10.58	0.627	0.00	172	63	29.140
TEST E—VARYING LOAD—TWO HOURS (20 minute runs; last line average)								
43.08	1152	4.055	10.62	0.625	...	172	63	.....
1.37	1250	1.691	0.81	8.190	...	180	66	.....
22.91	1220	3.160	7.25	0.915	...	185	67	.....
44.19	1120	4.159	10.63	0.625	...	170	69	.....
11.56	1231	2.369	4.88	1.360	...	184	70	.....
33.57	1196	3.590	9.35	0.710	...	185	71	.....
26.11	1195	3.171	8.23	0.806	0.00	179	68	29.150

TORQUE (at dynamometer)

Eng RPM	1150	1101	1048	996	947	899	854	800	753	702
Lb-ft	317.5	319.0	323.8	327.3	331.5	335.5	339.9	349.1	353.9	352.6

DRAWBAR HORSEPOWER TESTS

Hp	Draw bar pull lb	Speed miles per hr	Crank shaft speed rpm	Slip of drive wheels %	Fuel Consumption			Water used gal per hour	Temp Deg F		Barometer inches of mercury
					Gal per hour	Hp-hr per gal	Lb per hp-hr		Cool- ing med	Air	
TEST F—100% MAXIMUM LOAD—3rd Gear											
44.51	3563	4.68	1150	4.91	.....	Not Recorded	.....	.....	171	76	29.130
TEST G—OPERATING MAXIMUM LOAD											
40.64	6444	2.36	1149	12.33	.....	Not Recorded	.....	.....	175	78	29.130
42.52	4598	3.47	1153	6.59	.....	Not Recorded	.....	.....	167	78	29.135
42.12	3361	4.70	1151	4.71	.....	Not Recorded	.....	.....	171	80	29.135
38.40	1441	9.99	1151	2.24	.....	Not Recorded	.....	.....	175	78	29.130
TEST H—RATED LOAD—TEN HOURS—3rd Gear											
34.99	2769	4.74	1150	3.83	3.746	9.34	0.710	0.00	189	87	28.850
TEST J—OPERATING MAXIMUM LOAD—3rd Gear											
40.40	3246	4.67	1148	5.96	.....	Not Recorded	.....	.....	191	93	28.850
TEST K—OPERATING MAXIMUM LOAD—3rd Gear											
39.29	3401	4.33	1149	7.91	.....	Not Recorded	.....	.....	193	96	28.820

TIRES, WHEELS and WEIGHT

	Tests F, G, & H	Test J	Test K
Rear wheels			
Type	Cast iron	Cast iron	Cast iron
Liquid ballast	890 lb each	None	None
Added cast iron	690 lb each	None	None
Rear tires			
No. and size	Two 15-30	Two 15-30	Two 14-30
Ply	8	8	6
Air pressure	14 lb	12 lb	12 lb
Front wheels			
Type	Cast iron	Cast iron	Cast iron
Liquid ballast	None	None	None
Added cast iron	None	None	None
Front tires			
No. and size	Two 7.50-18	Two 7.50-18	Two 7.50-18
Ply	4	4	4
Air pressure	28 lb	28 lb	28 lb
Height of drawbar	16½ inches	17 inches	15½ inches
Static weight			
Rear end	8430 lb	5270 lb	5150 lb
Front end	2255 lb	2250 lb	2240 lb
Total weight as tested with operator	10860 lb	7695 lb	7565 lb

HORSEPOWER SUMMARY

	Draw- bar	Belt
1. Sea level (calculated) maximum horsepower (based on 60° F and 29.92" Hg)	46.42	50.53
2. Observed maximum horsepower (tests F & B)	44.51	48.86
3. Seventy-five per cent of calculated maximum drawbar horsepower and eighty-five per cent of calculated maximum belt horsepower (formerly ASAE and SAE ratings)	34.82	42.95

We, the undersigned, certify that this is a true and correct report of official tractor test No. 481.

L. F. LARSEN
Engineer in Charge

C. W. SMITH
F. D. YUNG
L. W. HURLBUT
Board of Tractor
Test Engineers

EXPLANATION OF TEST REPORT

TEST A: The manufacturer's representative operates the tractor for a minimum of 12 hours using light to heavy drawbar loads in each gear.

This serves as a period for limber up, general observation and adjustments. Adjustments that are permissible include valve tappet clearance, breaker point gap, spark plug gaps, clutch and others of a similar nature. No new parts or accessories can be installed without having mention made of it in the report.

No data are recorded during this preliminary run except the time that the engine is operated.

BELT HORSEPOWER TESTS

TEST B: The throttle valve is held wide open and the belt load on the dynamometer is adjusted so that the engine is at the rated speed recommended by the manufacturer. Carburetor, ignition timing and manifold adjustments are all set for maximum engine power.

This test is designed to determine maximum belt horsepower of the tractor at rated speed and to measure fuel consumption at the maximum power on the belt.

TEST C: For tractors with carburetors the best fuel economy does not always occur when the engine develops maximum power at rated speed. Test C is intended to allow the manufacturer's representative to select a more economical fuel setting even though there is a slight loss of power. *This more practical carburetor setting is used in all later tests except test F.* The throttle valve is held wide open and load adjusted to give rated rpm. Tests B and C are the same for diesel tractors, which have an altogether different fuel system.

TEST D: The throttle control lever is set so that the governor will maintain rated engine speed when rated load is applied. Rated load is 85% of 100% maximum, as obtained in test B, corrected to standard conditions.

This rating is somewhat less than the maximum belt horsepower in order that the operator may have a certain amount of reserve.

TEST E:

Varying load serves to show the range of engine speeds when the engine is controlled by the governor during the following varied loads of 20 minutes each: rated load, no load, $\frac{1}{2}$ rated load, maximum load at wide open throttle valve, $\frac{1}{4}$ and $\frac{3}{4}$ rated load.

The average result of this test shows the average power and fuel consumption. Since the average tractor is subjected to varying loads, these data serve well in predicting fuel consumption and efficiency of a tractor in general use.

Torque, lb-ft at dynamometer, is obtained with wide open throttle and sufficient load is applied to give several readings.

DRAWBAR HORSEPOWER TESTS

In all drawbar tests the pull exerted by the tractor is transmitted by a hydraulic pressure cylinder to a recording instrument in the test car. All tests are made on the same dirt test course which is maintained by grading, sprinkling and rolling so that it remains very nearly the same throughout the season.

The same tires, wheels and weights are used for all tests except J and K.

TEST F: A drawbar test, the results of which are used to determine the rated drawbar horsepower in test H. The carburetor is set to develop maximum power as in test B. The rated gear recommended by manufacturer as plow gear is used in this test. The drawbar load is adjusted to give rated engine speed.

TEST G: Maximum drawbar horsepower is determined in each gear when the carburetor is set for fuel economy as in test C. The throttle valve is held wide open and the load is applied so that the engine runs at rated engine speed.

When operating in low gear it is not uncommon for the tractor to develop less drawbar horsepower than in rated gear because of excessive wheel slippage. When excessive wheel slippage occurs the load is reduced until slippage approaches 16%. When the load is reduced it is necessary to operate the tractor engine at part throttle and control engine speed by governor action.

TEST H: Intended to test the ability of the tractor to run continuously for 10 hours at rated drawbar horsepower and to determine the fuel consumption during that time. Rated drawbar horsepower is 75% of 100% maximum drawbar horsepower (Test F), corrected to standard conditions.

When operating at rated load the throttle control lever is set to maintain rated engine speed. This rating is less than maximum drawbar horsepower in order that the operator may have a certain amount of reserve.

TEST J: The tractor is operated in rated gear with all added weight removed. This test shows the effect of the removal of added weight on the performance of the tractor when compared with test G.

Removal of wheel weights generally increases wheel slippage and decreases drawbar horsepower.

TEST K: Similar to test J except that the smallest tires and lightest wheels offered by the manufacturer are used.

