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Test 548: OC-12

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: June 15 to June 28, 1955
Manufacturer: THE OLIVER CORPORATION,
CLEVELAND, OHIO
Manufacturer's Rating: Not rated

NEBRASKA TRACTOR TEST NO. 548

OLIVER OC-12

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										
57.93	1750	5.973	9.70	0.636	0.00	133	64	28.865		
TEST C—OPERATING MAXIMUM LOAD—ONE HOUR										
54.64	1750	5.195	10.52	0.586	0.00	132	68	28.885		
TEST D—RATED LOAD—ONE HOUR										
51.45	1750	5.015	10.26	0.601	0.00	136	72	28.890		
TEST E—VARYING LOAD—TWO HOURS (20 minute runs; last line average)										
51.59	1751	5.023	10.27	0.600	...	137	72		
1.40	1859	2.015	0.69	8.871	...	122	73		
26.74	1814	3.441	7.77	0.793	...	132	74		
53.34	1727	5.101	10.46	0.589	...	139	75		
13.57	1837	2.677	5.07	1.216	...	129	75		
39.37	1787	4.215	9.34	0.660	...	138	75		
31.00	1796	3.745	8.28	0.745	0.00	133	74	28.900		
TORQUE (At Dynamometer)										
Eng rpm	1745	1652	1551	1444	1343	1243	1143	1045	943	843
Lb-ft	324.6	328.0	333.9	341.8	350.9	355.3	358.4	364.9	371.9	369.6
Dyn rpm	867	821	772	719	668	618	568	519	468	419

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 H—RATED LOAD—TEN HOURS—2nd Gear											
37.85	10399	1.36	1754	15.18	1st gear (part throttle)				150	72	28.860
TEST F—100% MAXIMUM LOAD											
50.83	8403	2.27	1750	3.40	2nd gear				156	76	29.060
TEST G—OPERATING MAXIMUM LOAD											
37.85	10399	1.36	1754	15.18	1st gear (part throttle)				150	72	28.860
47.10	7831	2.26	1745	3.61	2nd gear				160	82	29.040
46.82	5322	3.30	1752	1.89	3rd gear				157	82	29.040
44.08	3161	5.23	1749	1.08	4th gear				158	82	29.040

FUEL, OIL and TIME Gasoline Octane No. ASTM 80.3 Research 85.9 (rating taken from oil company's typical inspection data): weight per gallon 6.164 lb OIL SAE 20 to motor 1.724 gal drained from motor 1.173 gal Total time motor was operated 42½ hours.

CHASSIS Type Tracklayer Serial No. 1Jr-000 Tread width 44" Wheel base 71 1/16" Measured length of track 219" Cleats integral with shoes Cleats per track 33 Size of cleats 16" x 1¼" Advertised speeds mph first 1.60 second 2.34 third 3.34 fourth 5.27 reverse 1.72 and 3.60 Belt pulley diam 12" face 8½"rpm 1034 Belt speed 3250 fpm Clutch double plate clutch operated by foot pedal Seat upholstered seat using sponge rubber and steel spring Brakes contracting bands operated by two steering levers that can be locked by latches Steering hand levers controlling brake.

ENGINE Make Hercules JXLD Type 6 cylinder vertical Serial No. 1739198 Crankshaft mounted lengthwise Head L Lubrication pressure Bore and stroke 4" x 4½" Rated rpm 1750 Compression ratio 6.25 to 1 Displacement 339 cu in Port diameter inlet 1½" exhaust 1½" Governor variable speed centrifugal Carburetor size 1 7/16" Ignition system battery Starting system 6 volt battery Air cleaner oil washed wire coil Muffler was not used Oil filter replaceable paper element Cooling medium temperature control thermostat.

TOTAL WEIGHT AS TESTED (With operator) 11,259 pounds.

REPAIRS AND ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data and without allowances, additions or deductions. Tests B and F were made with carburetor set for 100% maximum belt horsepower and data from these tests were used in determining the horsepower to be developed in tests D and H, respectively. Tests C, D, E, G, and H were made with an operating setting of the carburetor (selected by the manufacturer) of 94.6% of maximum belt horsepower.

HORSEPOWER SUMMARY

	Drawbar	Belt
1. Sea level (calculated) maximum horsepower (based on 60° F. and 29.92" HG)	53.14	60.27
2. Observed maximum horsepower (tests F and B)	50.83	57.93
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)	39.86	51.23

We, the undersigned, certify that this is a true and correct report of official tractor test No. 548.

L. F. LARSEN
Engineer-in-Charge

L. W. HURLBUT
G. W. STEINBRUEGGE
J. J. SULEK
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.

