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9-27-1954

Test 525 Oliver Super 88

Nebraska Tractor Test Lab

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Department of Agricultural Engineering
Dates of test: September 27 to October 16, 1954
Manufacturer: THE OLIVER CORPORATION,
CHARLES CITY, IOWA
Manufacturer's rating: Not rated

NEBRASKA TRACTOR TEST NO. 525

OLIVER SUPER 88 HC

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										
55.77	1601	4.509	12.37	0.496	0.00	179	68	28.950		
TEST C—OPERATING MAXIMUM LOAD—TWO HOURS										
53.14	1599	4.194	12.67	0.484	0.00	175	63	28.950		
TEST D—RATED LOAD—ONE HOUR										
49.59	1601	4.051	12.24	0.501	0.00	174	65	28.940		
TEST E—VARYING LOAD—TWO HOURS (20 minute runs; last line average)										
49.41	1597	4.048	12.21	0.503	...	174	60	.....	
1.94	1730	1.599	1.21	5.057	...	164	66	.....	
26.02	1678	2.884	9.02	0.680	...	167	66	.....	
51.28	1527	4.043	12.68	0.484	...	176	65	.....	
13.16	1694	2.185	6.02	1.019	...	165	65	.....	
37.96	1636	3.520	10.78	0.569	...	170	64	.....	
29.96	1643	3.046	9.84	0.624	0.00	169	64	28.930		
TORQUE (At Dynamometer)										
Eng rpm.	1595	1490	1397	1289	1199	1096	999	888	805	699
Lb-ft.	332.7	340.7	343.9	344.2	346.0	347.7	347.7	346.3	346.3	345.6
Dyn rpm.	831	777	727	672	625	570	520	461	418	362

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											
47.08	4166	4.24	1606	6.99	.....	Not Recorded	.....	174	65	28.420
TEST G—OPERATING MAXIMUM LOAD											
38.03	6354	2.24	1600	14.96	.....	Not Recorded	.....	169	60	29.040
44.80	5467	3.07	1601	10.19	.....	Not Recorded	.....	170	58	29.030
45.95	4093	4.21	1600	7.18	.....	Not Recorded	.....	169	56	29.030
46.45	3136	5.55	1601	5.52	.....	Not Recorded	.....	170	56	29.030
46.19	2509	6.90	1603	4.75	.....	Not Recorded	.....	171	56	29.040
43.34	1343	12.10	1602	2.71	.....	Not Recorded	.....	168	58	29.030
TEST H—RATED LOAD—TEN HOURS—3rd Gear											
36.84	3220	4.29	1600	5.35	3.578	10.30	0.596	0.00	173	69	28.472
TEST J—OPERATING MAXIMUM LOAD—3rd Gear											
36.04	3512	3.85	1604	15.71	.....	Not Recorded	.....	170	50	28.960
TEST K—OPERATING MAXIMUM LOAD—3rd Gear											
32.31	3262	3.71	1606	15.76	.....	Not Recorded	.....	168	52	29.040

TIRES, WHEELS AND WEIGHT

	Tests F, G, & H	Test J	Test K
Rear wheels			
Type	Cast iron	Cast iron	Cast iron
Liquid ballast	794 lb each	None	None
Added cast iron	1120 lb each	None	None
Rear tires			
No. and size	Two 13-38	Two 13-38	Two 12-38
Ply	6	6	6
Air pressure	18 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 6.00-16	Two 6.00-16	Two 6.00-16
Ply	4	4	4
Air pressure	28 lb	28 lb	28 lb
Height of drawbar	21 inches	22 inches	21 inches
Static weight			
Rear end	7610 lb	3782 lb	3750 lb
Front end	1558 lb	1556 lb	1550 lb
Total weight as tested with operator	9343 lb	5513 lb	5475 lb

FUEL, OIL and TIME Gasoline Octane No. ASTM 79 Research 84.5 (rating taking from oil company's typical inspection data): weight per gallon 6.137 lb Oil SAE 10; to motor 1.753 gal; drained from motor 1.474 gal Total time motor was operated 40½ hours.

CHASSIS Type Tricycle Serial No. 6619-800 Tread width rear 60" to 92½" front 8½", 10½" and 12½" Wheel base 93¾" Hydraulic control system direct engine drive Advertised speeds mph first 2.49 second 3.22 third 4.28 fourth 5.55 fifth 6.82 sixth 11.75 reverse 2.55 and 4.38 Belt pulley diam. 11½" face 7¼" rpm 992 Belt speed 3080 fpm Clutch single plate disc clutch operated by foot pedal Seat pressed steel cushioned by rubber in torsion Brakes disc brakes operated by two foot pedals Equalized by connecting bar which serves as a master brake pedal Power take-off direct engine drive with independent hand clutch.

ENGINE Make Oliver Type 6 cylinder vertical Serial No. 949637 Crankshaft mounted lengthwise Head I Lubrication pressure Bore and stroke 3¾" x 4" Rated rpm 1600 Compression ratio 7.00 to 1 Displacement 265 cu. in. Port diameter valves inlet 1½" exhaust 1¼" Governor variable speed centrifugal Carburetor size 1" Ignition system battery Starting system 6 volt battery Air cleaner oil washed wire mesh Muffler was used Oil filter replaceable waste packed cartridge Cooling system temperature control thermostat.

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, H, J & K were made with an operating setting of the carburetor (selected by the manufacturer) of 94.8% of maximum belt horsepower.

HORSEPOWER SUMMARY

	Drawbar	Belt
1. Sea level (calculated) maximum horsepower (based on 60°F and 29.92" HG)	49.81	58.08
2. Observed maximum horsepower (tests F and B)	47.08	55.77
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)	37.36	49.37

We, the undersigned, certify that this is a true and correct report of official tractor test No. 525.

L. F. LARSEN
Engineer-in-charge

C. W. SMITH
L. W. HURLBUT
F. D. YUNG
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.

