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Test 457: Oliver Row-Crop 77 Diesel

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: May 21 to May 28, 1951.
Manufacturer: THE OLIVER CORPORATION,
CHARLES CITY, IOWA
Manufacturer's rating: Not rated.

NEBRASKA TRACTOR TEST NO. 457

OLIVER ROW CROP 77 DIESEL

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	
TESTS B AND C—100% MAXIMUM LOAD—TWO HOURS								
* 35.79	1601	2.466	14.51	0.474	0.00	179	65	28.950
TEST D—RATED LOAD—ONE HOUR								
31.61	1601	2.215	14.27	0.482	0.00	175	66	28.950
TEST E—VARYING LOAD—TWO HOURS (20 minute runs; last line average)								
31.67	1603	2.215	14.30	0.481	...	174	66
1.80	1728	0.689	2.61	2.633	...	155	64
16.48	1663	1.470	11.21	0.613	...	165	67
32.33	1531	2.268	14.25	0.483	...	176	68
8.41	1698	1.038	8.10	0.849	...	160	66
24.22	1633	1.845	13.13	0.524	...	171	70
19.15	1643	1.587	12.07	0.570	0.00	167	67	28.960

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		Cooling med	Air	
TESTS F AND G—100% MAXIMUM LOAD											
27.71	4818	2.16	1598	15.04	Not Recorded				192	77	28.665
30.82	3726	3.10	1604	7.55	Not Recorded				190	75	28.665
31.28	2795	4.20	1598	5.19	Not Recorded				187	74	28.665
31.01	2076	5.60	1599	3.75	Not Recorded				182	70	28.665
30.53	1730	6.62	1600	3.13	Not Recorded				181	69	28.665
27.35	880	11.65	1602	1.70	Not Recorded				178	72	28.940
TEST H—RATED LOAD—TEN HOURS—3rd GEAR											
25.14	2225	4.24	1599	4.25	2.026	12.41	0.554	0.00	182	77	28.610
TEST J—OPERATING MAXIMUM LOAD—3rd GEAR											
30.43	2756	4.14	1598	7.56	Not Recorded				180	81	28.800
TEST K—OPERATING MAXIMUM LOAD—3rd GEAR											
24.68	2600	3.56	1600	15.99	Not Recorded				176	73	28.800

TIRES, WHEELS AND WEIGHT

	Tests F, G, & H	Test J	Test K
Rear wheels			
Type	Cast iron	Cast iron	Cast iron
Liquid ballast	None	None	None
Added cast iron	1139 lb each	None	None
Rear tires			
No and size	Two 12-38	Two 12-38	Two 10-38
Ply	6	6	4
Air pressure	16 lb	14 lb	14 lb
Front wheels			
Type	Pressed steel	Pressed steel	Pressed steel
Liquid ballast	None	None	None
Added cast iron	None	None	None
Front tires			
No. and size	Two 5.50-16	Two 5.50-16	Two 5.50-16
Ply	4	4	4
Air pressure	28 lb	28 lb	28 lb
Height of drawbar	20½ inches	21½ inches	19 inches
Static weight			
Rear end	5717 lb	3440 lb	3020 lb
Front end	1315 lb	1317 lb	1307 lb
Total weight as tested with operator	7207 lb	4932 lb	4502 lb

FUEL, OIL, and TIME Diesel fuel cetane No. 47 (rating taken from oil company's typical inspection data); weight per gallon 6.879 lb Oil SAE 10; to motor 1.491 gal; drained from motor 1.128 gal Total time motor was operated 40 hours.

CHASSIS Type tricycle Serial No DSL337222 Tread width rear 60" to 92½" front 7½" or 12½" Wheel base 90½" Hydraulic control system direct engine drive Advertised speeds mph first 2½ second 3¼ third 4¼ fourth 5½ fifth 6½ sixth 11½ reverse 2½ and 4½ Belt pulley diam 11½" face 7¼" rpm 992 Belt speed 3080 fpm Clutch single plate dry disc clutch operated by foot pedal Seat pressed steel cushioned by rubber in torsion Brakes external contracting bands operated by two foot pedals Equalized by connecting bar which serves as master brake pedal Power take-off direct drive with independent hand clutch.

ENGINE Make Oliver Diesel Type 6 cylinder vertical Serial No D1831128 Crankshaft mounted lengthwise Head I Lubrication pressure Bore and Stroke 3 5/16" x 3 3/4" Rated rpm 1600 Compression ratio 15.75 to 1 Displacement 193.9. Port diameter valves inlet 1 5/64" exhaust 15/16" Governor variable speed centrifugal Starting system 12 volt electric Air cleaner oil washed wire mesh Muffler was used Oil Filter two replaceable waste packed elements Fuel filters one permanent edge type fuel strainer in sediment bowl and one replaceable filter cartridge Cooling medium 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 fuel pump set by manufacturer to develop approximately 37 corrected 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 and K were made with the same setting.

HORSEPOWER SUMMARY

	Draw-bar	Belt
1. Sea level (calculated) maximum horsepower (based on 60° F and 29.92" Hg)	33.09	37.17
2. Observed maximum horsepower (tests F and B)	31.28	35.79
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)	24.82	31.59

We, the undersigned, certify that this is a true and correct report of official tractor test No. 457.

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 preliminary period for limber up, general observation and adjustments. No data are recorded during this preliminary run.

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 as near as practical to the rated speed recommended by the manufacturer. Carburetor, ignition timing and manifold adjustments are all set for maximum engine power.

TEST C: The manufacturer has an opportunity to select a more practical carburetor setting which may slightly lower the power output but give better fuel economy. As in test B, the throttle valve is held wide open and the load is adjusted to give the rated engine speed. Tests B and C may be the same, as in the case of a diesel engine where the manufacturer wants to use the same setting as in test B. The same setting is used for tests D, E, G, H, J and K.

TEST D: The throttle control lever is set so 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.

TEST E: This test serves to show how well the governor controls the engine speed when the following loads are applied: rated load, no load, $\frac{1}{2}$ load, maximum load at wide-open throttle, $\frac{1}{4}$ load and $\frac{3}{4}$ load. This test also shows some significant fuel consumption results for these loads. The average fuel consumption given for this test is quite significant. The average farm tractor is subjected to a varying load condition throughout the year.

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: The tractor is operated in the gear designated by the manufacturer as rated gear (the gear recommended as most suitable for plowing). The carburetor is set as in test B. The throttle valve is held wide open and the drawbar load adjusted to maintain rated engine speed. Results of this test are used to determine the rated load for test H.

TEST G: The tractor is tested for maximum drawbar horsepower in each gear, using the more efficient carburetor setting as determined 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 the lower gears the tractor often is unable to develop maximum horsepower because of excessive wheel slippage. Then the load is reduced until slippage approaches 16%.

TEST H: This test lasts 10 hours and is the only drawbar test where fuel consumption is measured. The load applied is 75% of 100% maximum drawbar horsepower (test F) corrected to standard conditions. The throttle lever is set so that the governor gives rated engine speed.

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.

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

