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January 1951

Test 467: Oliver Row-Crop 66 Diesel

Nebraska Tractor Test Lab

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Nebraska Tractor Test Lab, "Test 467: Oliver Row-Crop 66 Diesel" (1951). *Nebraska Tractor Tests*. 516.
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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: October 12 to October 18, 1951
Manufacturer: THE OLIVER CORPORATION,
CHARLES CITY, IOWA
Manufacturer's rating: Not rated.

NEBRASKA TRACTOR TEST NO. 467

OLIVER ROW CROP 66 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 | | | | | | | | |
| 25.03 | 1602 | 1.762 | 14.21 | 0.493 | 0.00 | 184 | 77 | 28.837 |
| TEST D—RATED LOAD—ONE HOUR | | | | | | | | |
| 22.45 | 1600 | 1.579 | 14.22 | 0.493 | 0.00 | 175 | 77 | 28.830 |
| TEST E—VARYING LOAD—TWO HOURS (20 minute runs; last line average) | | | | | | | | |
| 22.43 | 1599 | 1.575 | 14.24 | 0.492 | ... | 175 | 77 | |
| 1.93 | 1724 | 0.561 | 3.44 | 2.036 | ... | 156 | 75 | |
| 11.63 | 1653 | 1.147 | 10.14 | 0.691 | ... | 164 | 75 | |
| 24.22 | 1549 | 1.699 | 14.26 | 0.492 | ... | 182 | 75 | |
| 6.05 | 1704 | 0.757 | 7.99 | 0.878 | ... | 158 | 73 | |
| 17.21 | 1631 | 1.301 | 13.23 | 0.530 | ... | 167 | 74 | |
| 13.91 | 1643 | 1.173 | 11.86 | 0.591 | ... | 167 | 75 | 28.830 |

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 | |
| TESTS F and G—MAXIMUM LOAD | | | | | | | | | | | |
| 20.38 | 3571 | 2.14 | 1598 | 15.89 | —Not Recorded— | | | | 169 | 73 | 28.795 |
| 21.74 | 2674 | 3.05 | 1601 | 9.25 | —Not Recorded— | | | | 177 | 71 | 28.795 |
| 22.05 | 2011 | 4.11 | 1605 | 6.64 | —Not Recorded— | | | | 177 | 70 | 28.785 |
| 21.91 | 1492 | 5.51 | 1599 | 4.90 | —Not Recorded— | | | | 177 | 70 | 28.780 |
| 21.69 | 1239 | 6.56 | 1600 | 4.13 | —Not Recorded— | | | | 176 | 70 | 28.790 |
| 19.09 | 616 | 11.62 | 1601 | 2.22 | —Not Recorded— | | | | 177 | 71 | 28.770 |
| TEST H—RATED LOAD—TEN HOURS—3rd Gear | | | | | | | | | | | |
| 17.70 | 1587 | 4.18 | 1601 | 4.78 | 1.464 | 12.09 | 0.580 | 0.00 | 166 | 49 | 29.048 |
| TEST J—OPERATING MAXIMUM LOAD—3rd Gear | | | | | | | | | | | |
| 22.50 | 2123 | 3.97 | 1603 | 9.87 | —Not Recorded— | | | | 170 | 49 | 29.155 |
| TEST K—OPERATING MAXIMUM LOAD—3rd Gear | | | | | | | | | | | |
| 18.18 | 1972 | 3.46 | 1608 | 16.23 | —Not Recorded— | | | | 168 | 51 | 28.950 |

FUEL, OIL and TIME Diesel fuel cetane No. 47 (rating taken from oil company's typical inspection data); weight per gallon 7.011 lb Oil SAE 10; to motor 0.980 gal; drained from motor 0.806 gal Total time motor was operated 40 hours.

CHASSIS Type tricycle Serial No DSL428467 Tread width rear 60" to 88" front 6 1/2" and 11 1/2" Wheel Base 86 11/16" Hydraulic control system direct engine drive Advertised speeds mph first 2 1/2 second 3 1/4 third 4 1/4 fourth 5 3/8 fifth 6 3/8 sixth 11 3/8 reverse 2 1/2 and 4 3/8 Belt pulley diam 11 1/2" face 7 1/4" rpm 987 Belt speed 3065 fpm Clutch single plate dry disc 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 4 cylinder vertical Serial No. D1846622 Crankshaft mounted lengthwise Head 1 Lubrication pressure Bore and Stroke 3 5/16" x 3 3/4" Rated rpm 1600 Compression ratio 15.5 to 1 Displacement 129.3 cu in Port Diameter Valves inlet 1 5/64" exhaust 15/16" Governor variable speed centrifugal Starting System 12 volt battery Air Cleaner oil washed wire mesh Muffler was used Oil Filter one replaceable waste packed element 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 26.3 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.

TIRES, WHEELS and WEIGHT

| | Tests F, G, & H | Test J | Test K |
|---|-----------------|---------------|---------------|
| Rear wheels | | | |
| Type | Cast iron | Cast iron | Pressed steel |
| Liquid ballast | 250 lb each | None | None |
| Added cast iron | 711 lb each | None | None |
| Rear tires | | | |
| No. and size | Two 10-38 | Two 10-38 | Two 8-38 |
| Ply | 6 | 6 | 4 |
| Air pressure | 18 lb | 12 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 5.00-15 | Two 5.00-15 | Two 5.00-15 |
| Ply | 4 | 4 | 4 |
| Air pressure | 28 lb | 28 lb | 28 lb |
| Height of drawbar | 22 1/2 inches | 23 inches | 20 1/2 inches |
| Static weight | | | |
| Rear end | 4532 lb | 2610 lb | 2138 lb |
| Front end | 1020 lb | 1020 lb | 1012 lb |
| Total weight as tested with operator | 5717 lb | 3795 lb | 3315 lb |

HORSEPOWER SUMMARY

| | Draw- bar | Belt |
|--|--------------|-------|
| 1. Sea level (calculated) maximum horsepower (based on 60° F and 29.92" Hg) | 23.14 | 26.39 |
| 2. Observed maximum horsepower (tests F & B) | 22.05 | 25.03 |
| 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) | 17.36 | 22.43 |

We, the undersigned, certify that this is a true and correct report of official tractor test No. 467.

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.

