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November 1957

## Test 633: Oliver OC-15 Diesel

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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Department of Agricultural Engineering  
Dates of test: November 4 to November 9, 1957  
Manufacturer: THE OLIVER CORPORATION,  
CLEVELAND, OHIO  
Manufacturer's rating: Not Rated

NEBRASKA TRACTOR TEST NO. 633

OLIVER OC-15

#### BELT HORSEPOWER TESTS

Hp	Crank shaft speed rpm	Fuel Consumption			Temp. Deg. F.			Barometer inches of mercury		
		Gal per hr	Hp-hr per gal	Lb per hp-hr	Cooling medium	Air wet bulb	Air dry bulb			
TESTS B & C—100% MAXIMUM LOAD—TWO HOURS										
101.97	1500	7.502	13.59	0.515	190	48	60	29.157		
TEST D—RATED LOAD—ONE HOUR										
89.02	1500	6.126	14.53	0.482	181	48	60	29.123		
TEST E—VARYING LOAD—TWO HOURS (20 minute runs; last line average)										
89.25	1502	6.107	14.61	0.479	181	48	61	.....		
2.18	1606	1.813	1.20	5.821	163	47	58	.....		
46.69	1564	3.574	13.06	0.536	166	47	60	.....		
98.91	1447	7.221	13.70	0.511	191	49	62	.....		
23.96	1602	2.644	9.06	0.773	164	47	59	.....		
68.89	1544	4.766	14.45	0.484	170	48	61	.....		
54.98	1544	4.354	12.63	0.554	173	47	60	29.111		
TEST L—OPERATING MAXIMUM TORQUE										
% of rated rpm (engine)	100	94	90	85	80	75	70	65	60	55
% of rated-speed torque	100	102	102	101	101	103	102	101	100	98

#### DRAWBAR HORSEPOWER TESTS

Hp	Draw bar pull lbs	Speed miles per hr	Crank shaft speed rpm	Slip of drive wheels %	Fuel Consumption			Temp. Deg. F.			Barometer inches of mercury
					Gal per hr	Hp-hr per gal	Lb per hp-hr	Cool- ing med	Air wet bulb	Air dry bulb	
TEST H—RATED LOAD—TEN HOURS—2nd Gear											
71.64	10315	2.60	1499	1.56	5.650	12.68	0.552	171	33	36	28.986
TESTS F & G—100% MAXIMUM LOAD											
71.32	17218	1.55	1494	7.13	1st Gear (PartThrottle)			173	48	52	28.700
91.07	13135	2.60	1504	1.98	2nd Gear . . . . .			187	46	52	28.710
87.57	8754	3.75	1502	0.86	3rd Gear . . . . .			183	47	52	28.705
80.83	5417	5.60	1499	0.49	4th Gear . . . . .			178	42	47	28.720

**FUEL, OIL, WATER and TIME** Fuel Diesel Cetane No. ASTM 50 (rating taken from oil company's typical inspection data) Weight per gallon 7.000 lb Oil SAE 20 To motor 2.850 gal Drained from motor 2.022 gal Water used 0.00 Total time motor was operated 40 hours

**CHASSIS TYPE** Tracklayer Serial No. IVL 104 Tread width rear 74" Wheel base 87 3/4" Measured length of track 254" Cleats integral with shoes Cleats per track 35 Size of cleats 20" x 2" Air control system direct engine driven air compressor Advertised speeds mph first 1.67 second 2.64 third 3.76 fourth 5.60 reverse 1.99 and 4.48 Belt pulley diam. 13" Face 11" rpm 975 Belt speed 3318 fpm Belt flat Length 74' Width 10" Thickness 0.180" Maximum slip 1.12% Clutch single plate over center operated by hand lever Seat upholstered seat using sponge rubber and springs Brakes contracting bands operated by two hand levers that can be locked. Also operated by one foot pedal actuating compressed air for power brakes Equalized when using air brakes Steering hand levers actuating compressed air control.

**ENGINE** Make Hercules Diesel DRXC Type 6 cylinder vertical Serial No. R-394113 Crankshaft mounted lengthwise Head I Lubrication pressure Bore and stroke 4 3/8" x 5 1/4" Rated rpm 1500 Compression ratio 15 to 1 Displacement 529 cu. in. Valves port diameter Inlet 2.00" Exhaust 1.37" Governor variable speed centrifugal Starting system 24 volt (two-12 volt batteries) Air cleaner oil washed wire mesh Muffler not used Oil filter two permanent metal edge type filters Fuel filter two replaceable waste type elements Cooling medium temperature control thermostat

**TOTAL WEIGHT AS TESTED** (with operator) 19,005 lbs

**REPAIRS AND ADJUSTMENTS** During preliminary belt test oil leaked from pulley gear box, a new filler plug was installed. During tests F and G oil pressure line to air compressor was replaced.

**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 to develop approximately 104 corrected 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 and L were made with the same setting (selected by the manufacturer).

#### HORSEPOWER SUMMARY

	Drawbar	Belt
1. Sea level (calculated) maximum horsepower (based on 60°F and 29.92" Hg)	94.17	104.64
2. Observed maximum horsepower (tests F and B)	91.07	101.97
3. Seventy-five per cent of calculated maximum drawbar horsepower and eighty-five per cent of calculated maximum belt horsepower (ASAE and SAE ratings)	70.63	88.94

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 633.

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 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 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.

**TEST L:** This torque test is run with wide open throttle. Loads are applied to reduce engine speed in approximately ten 5% increments. Rated speed equals 100%. The corresponding dynamometer torque is recorded as a per cent of torque at rated speed.

### 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. When rubber tires are used, all tests are

made on the concrete test course. All crawler type tractors are tested on a 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.

