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7-7-1958

## Test 662: Oliver 995 GM Diesel Lugmatic

Nebraska Tractor Test Lab

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

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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: July 7 to July 23, 1958  
Manufacturer: THE OLIVER CORPORATION,  
CHARLES CITY, IOWA  
Manufacturer's rating: Not Rated

NEBRASKA TRACTOR TEST NO. 662

OLIVER 995 GM LUGMATIC DIESEL

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 POWER—TWO HOURS								
85.37	2000	6.775	12.60	0.555	144	66	70	28.850
TEST D—RATED POWER—ONE HOUR								
76.13	2059	6.166	12.35	0.567	142	68	72	28.863
TEST E—VARYING POWER—TWO HOURS (20 minute runs; last line average)								
76.14	2056	6.156	12.37	0.566	144	70	76	.....
1.91	2111	2.701	0.71	9.895	124	70	75	.....
38.59	2079	4.180	9.23	0.758	140	70	76	.....
84.15	1999	6.756	12.46	0.562	149	71	77	.....
19.52	2099	3.344	5.84	1.199	138	71	77	.....
57.47	2067	5.093	11.28	0.620	143	72	79	.....
46.30	2069	4.705	9.84	0.711	139	71	76	28.877

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—100% OBSERVED MAXIMUM HORSEPOWER—TWO HOURS—3rd Gear											
71.70	6533	4.12	2028	4.32	6.811	10.53	0.665	142	63	66	28.898
TEST H—75% PULL AT OBSERVED MAXIMUM H.P.—TEN HOURS—3rd Gear											
61.06	4871	4.70	2060	3.25	5.994	10.19	0.687	141	65	72	28.899
TEST H—50% PULL AT OBSERVED MAXIMUM H.P.—TWO HOURS—3rd Gear											
43.08	3282	4.92	2063	2.46	4.815	8.95	0.782	137	67	68	28.835
TESTS F & G—100% MAXIMUM POWER											
62.69	12538	1.88	1958	13.10	1st Gear	.....	.....	154	70	74	28.900
68.13	8571	2.98	2012	6.35	2nd Gear	.....	.....	149	70	74	28.900
71.44	6523	4.11	2021	4.32	3rd Gear	.....	.....	144	64	68	28.895
69.26	4726	5.50	2018	3.21	4th Gear	.....	.....	148	68	72	28.900
67.64	3672	6.91	2012	2.49	5th Gear	.....	.....	142	68	72	28.900
61.11	1835	12.49	2040	1.19	6th Gear	.....	.....	150	68	72	28.900
TEST J—OPERATING MAXIMUM POWER											
71.53	6655	4.03	2022	5.96	3rd Gear	.....	.....	144	67	71	28.920
TEST K—SPEED-PULL CHARACTERISTIC											
Pounds Pull	4871	6523	7200	7800	8350	9200	10,200	11,250	12,400		
Horsepower	61.06	71.44	71.0	68.6	64.6	61.3	57.1	51.0	39.7		
Miles Per Hour	4.70	4.11	3.7	3.3	2.9	2.5	2.1	1.7	1.2		

TIRES, WHEELS AND WEIGHT

	Tests F, G, H & K	Test J
Rear wheels		
Type	Cast iron	Cast iron
Liquid ballast	1470 lb each	None
Added cast iron	1060 lb each	None
Rear tires		
No. and size	Two 18-26	Two 18-26
Ply	8	8
Air pressure	16 lb	16 lb
Front wheels		
Type	Pressed steel	Pressed steel
Liquid ballast	120 lb each	None
Added cast iron	100 lb each	None
Front tires		
No. and size	Two 7.50-18	Two 7.50-18
Ply	6	6
Air pressure	36 lb	36 lb
Height of drawbar	17 inches	18½ inches
Static weight		
Rear end	13,200 lb	8,140 lb
Front end	3,370 lb	2,930 lb
Total weight as tested with operator	16,745 lb	11,245 lb

FUEL, OIL, WATER and TIME Fuel Diesel Ce-  
tane No. 52 (rating taken from oil company's typical  
inspection data) Weight per gallon 6.998 lb Oil  
SAE 30 To motor 2.625 gal Drained from motor  
1.755 gal Water used 0.057 gal Total time motor  
was operated 50 hours.

CHASSIS Type Standard Serial No. 530273 Tread  
width rear 66" front 59 15/16" Wheel base 79 7/8"  
Hydraulic control system direct engine drive with  
throw out control Advertised speeds mph first 0.9  
to 2.6 second 1.2 to 3.5 third 1.6 to 4.7 fourth 2.1  
to 6.2 fifth 2.7 to 7.8 sixth 4.7 to 13.8 reverse first  
1.0 to 2.9 second 1.8 to 5.2 Belt pulley diam. 12 1/4"  
face 9" rpm 1135 Belt speed 3642 fpm Belt flat  
Length 75' Width 8" Thickness 0.216" Maximum  
slip 1.00% Clutch single plate dry disc operated by  
foot pedal Seat pressed steel cushioned by rubber in  
torsion Brakes double disc operated by two foot pedals  
Equalized by connecting bar which serves as master  
brake pedal Power take-off direct drive with inde-  
pendent hand clutch Steering aided by hydraulic  
power steering.

ENGINE Make General Motors 3-71 2 cycle  
Diesel Type 3 cylinder vertical with blower Serial  
No. 3A-34591 Crankshaft mounted lengthwise Head  
I Lubrication pressure Bore and stroke 4 1/4" x 5"  
Rated rpm 2000 Compression ratio 17 to 1 Dis-  
placement 213 cu. in. Valves port diameter Inlet  
multiple ports Exhaust 1 1/2" Governor variable speed  
centrifugal Starting system 12 volt (two 6 volt bat-  
teries) Air cleaner (two used) oil washed wire mesh  
Muffler was used Oil filter replaceable paper element  
Fuel filter one replaceable cotton element and  
one replaceable paper element Cooling medium  
temperature control thermostat.

REPAIRS AND ADJUSTMENTS During Test "H"  
one of the bolts holding wheel weights became loose  
on the right hand drive wheel. It was necessary to  
reset this bolt before finishing this test.

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 89 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,  
J, and K were made with the same setting.

This tractor is equipped with a hydraulic torque  
converter which automatically loads the engine by  
controlling the forward travel speed according to  
the load applied.

HORSEPOWER SUMMARY

	Drawbar	Belt
1. Sea level (calculated) maximum horsepower (based on 60°F and 29.92" Hg)	74.54	89.39
2. Observed maximum horsepower (tests F and B)	71.44	85.37

We, the undersigned, certify that this is a true and  
correct report of official Tractor Test No. 662.

L. F. LARSEN  
Engineer-in-Charge

L. W. HURLBUT, Chairman  
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 manual throttle control lever is set so that 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 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 manual throttle control lever is set the same as for tests B and C allowing the governor to control engine speed at part throttle. Load is applied until 85% of maximum corrected horsepower found in test B is obtained.

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.

### 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. The same tires, wheels and weights are used for all tests except J. All crawler type tractors are tested on an earthen test course which is maintained by grading, sprinkling and rolling so that it remains very nearly the same for each test.

**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 the 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 manual throttle control lever is set so that 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 15%. 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 horsepower the manual throttle control lever is set the same as in tests F and G allowing the governor to maintain engine speed at part throttle. 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:** This is intended to show the pull, horsepower, and travel speed of the tractor at rated horsepower (taken from test H); maximum horsepower (taken from test G); and at least four other conditions obtained by reducing travel speed in 10% increments by overload.

