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## Test 1040: Oliver 1855 Diesel

Nebraska Tractor Test Lab

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

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# NEBRASKA TRACTOR TEST 1040—OLIVER 1855 DIESEL

## POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Air wet bulb	Air dry bulb	Barometer inches of Mercury
<b>MAXIMUM POWER AND FUEL CONSUMPTION</b>								
<b>Rated Engine Speed—Two Hours (PTO Speed 984 rpm)</b>								
98.60	2400	6.223	0.437	15.84	181	67	55	28.767
<b>VARYING POWER AND FUEL CONSUMPTION—TWO HOURS</b>								
89.12	2551	5.924	0.461	15.04	180	68	76	.....
0.00	2652	1.953	.....	.....	170	68	76	.....
45.56	2608	3.824	0.581	11.91	172	67	75	.....
99.57	2400	6.266	0.436	15.89	179	66	74	.....
22.84	2632	2.966	0.900	7.70	170	66	74	.....
67.51	2582	4.923	0.505	13.71	175	66	75	.....
Av. 54.10	2571	4.309	0.552	12.56	174	67	75	28.740

## DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Slip of drivers %	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cool- ing med	Air wet bulb	Air dry bulb	Barometer inches of Mercury
<b>VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST</b>											
<b>Maximum Available Power—Two Hours—8th Gear (3rd Direct)</b>											
82.65	6680	4.64	2399	6.79	6.216	0.521	13.30	183	53	63	29.105
<b>75% of Pull at Maximum Power—Ten Hours—8th Gear (3rd Direct)</b>											
68.51	5100	5.04	2552	4.87	5.600	0.566	12.23	186	64	82	28.816
<b>50% of Pull at Maximum Power—Two Hours—8th Gear (3rd Direct)</b>											
47.20	3410	5.19	2594	3.51	4.505	0.661	10.48	175	47	53	29.110
<b>MAXIMUM POWER WITH BALLAST</b>											
61.72	11487	2.01	2561	14.88	3rd Gear (1st Over)	179	54	69	29.040		
81.45	8047	3.80	2399	8.17	6th Gear (3rd Under)	180	57	62	28.940		
84.30	6802	4.65	2402	6.75	8th Gear (3rd Direct)	180	57	63	28.940		
83.66	6559	4.78	2401	6.36	9th Gear (4th Under)	180	57	63	28.960		
81.67	5412	5.66	2398	5.12	10th Gear (3rd Over)	180	57	62	28.960		
84.17	5408	5.84	2400	5.20	11th Gear (4th Direct)	180	57	62	28.960		
82.14	4356	7.07	2398	4.08	12th Gear (4th Over)	180	57	62	28.960		
82.66	3336	9.29	2402	3.27	14th Gear (5th Direct)	179	57	63	28.960		
<b>MAXIMUM PULL WITHOUT BALLAST</b>											
75.36	9113	3.10	2437	14.84	5th Gear (2nd Direct)	182	67	80	28.860		

## VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—8th Gear (3rd Direct)

Pounds Pull	6802	7641	8009	8177	8027	7830
Horsepower	84.30	84.14	78.03	69.28	58.31	47.81
Crankshaft Speed rpm	2402	2158	1918	1671	1431	1199
Miles per Hour	4.65	4.13	3.65	3.18	2.72	2.29
Slip of Drivers %	6.75	7.80	8.10	8.39	8.25	7.95

## TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No. size, ply & psi	Two 23.1-34; 8; 16	Two 23.1-34; 8; 16
Ballast	—Liquid	1297 lb each	None
	—Cast iron	456 lb each	None
Front tires	—No. size, ply & psi	Two 11L-15; 8; 40	Two 11L-15; 8; 40
Ballast	—Liquid	None	None
	—Cast iron	78 lb each	None
Height of drawbar		20½ inches	21 inches
Static weight with operator—Rear		11845 lb	8340 lb
	Front	2955 lb	2800 lb
	Total	14800 lb	11140 lb

The University of Nebraska Agricultural Experiment Station  
E. F. Frolik, Dean; H. W. Ottoson, Director; Lincoln, Nebraska

## Department of Agricultural Engineering

Dates of Test: May 5 to May 22, 1970

Manufacturer: WHITE FARM EQUIPMENT,  
HOPKINS, MINNESOTA

**FUEL, OIL and TIME** Fuel No 2 Diesel  
Cetane No 50.8 (rating taken from oil company's  
typical inspection data) Specific gravity con-  
verted to 60°/60° 0.8322 Weight per gallon  
6.928 lb Oil SAE 30 API service classification  
MS-DS To motor 2.636 gal Drained from motor  
1.408 gal Transmission and final-drive lubricant  
SAE 80 Total time engine was operated 49  
hours.

**ENGINE** Make Oliver Diesel Type 6 cylinder  
with turbo charger Serial No 186012 Crank-  
shaft mounted lengthwise Rated rpm 2400 Bore  
and stroke 3⅞" x 4⅜" Compression ratio 16 to 1  
Displacement 310 cu in Cranking system 12 volt  
electric (two 6 volt batteries) Lubrication pres-  
sure Air cleaner dry type with replaceable  
paper element and replaceable safety element  
Oil filter full flow replaceable cotton element  
Fuel filter replaceable pleated paper primary  
cartridge and replaceable cotton secondary car-  
tridge Muffler was used Cooling medium tem-  
perature control thermostat.

**CHASSIS** Type standard Serial No 220936 685  
Tread width rear 61½" to 111½" front 61½"  
to 87½" Wheel base 109½" Center of gravity  
without operator or ballast, with minimum  
tread, with fuel tank filled and tractor serviced  
for operation) Horizontal distance forward from  
center-line of rear wheels 30.7" Vertical distance  
above roadway 35.9" Horizontal distance from  
center of rear wheel tread 0" to the right/left  
Hydraulic control system direct engine drive  
Transmission selective gear fixed ratio with par-  
tial (3) range operator controlled power shifting  
Advertised speeds mph first 1.44 second 1.73  
third 20.7 fourth 2.76 fifth 3.33 sixth 3.86 seventh  
3.99 eighth 4.65 ninth 4.78 tenth 5.58 eleventh  
5.76 twelfth 6.90 thirteenth 7.44 fourteenth 8.97  
fifteenth 10.75 sixteenth 12.86 seventeenth 15.50  
eighteenth 18.58 reverse 1.62, 1.95, 2.34, 4.35,  
5.25, 6.29 Clutch single plate dry disc operated  
by foot pedal Brakes triple disc operated hy-  
draulically by two foot pedals that can be locked  
together Steering hydrostatic power Turning  
radius (on concrete surface with brake applied)  
right 155" left 155" (on concrete surface without  
brake) right 170" left 170" Turning space diam-  
eter (on concrete surface with brake applied)  
right 310" left 310" (on concrete surface without  
brake) right 350" left 350" Belt pulley 1035 rpm  
at 2400 engine rpm diam 11¼" face 8¾" Belt  
speed 3049 fpm Power take-off 984 rpm at 2400  
engine rpm.

**REPAIRS and ADJUSTMENTS:** No repairs  
or adjustments.

**REMARKS:** All test results were determined  
from observed data obtained in accordance with  
the SAE and ASAE test code. First and second  
gears were not run as it was necessary to limit  
the pull in third gear because of excessive slip-  
page. The fourth, fifth, seventh, thirteenth, fif-  
teenth, sixteenth, seventeenth and eighteenth  
gears were not run as test procedure requires  
only eight gears.

We, the undersigned certify that this is a true  
and correct report of official Tractor Test 1040.

L. F. LARSEN  
Engineer-In-Charge

G. W. STEINBRUEGGE  
W. E. SPLINTER  
D. E. LANE

Board of Tractor Test Engineers

# EXPLANATION OF TEST REPORT

## GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

## PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. Prior to the maximum power run the tire tread-bar height must be at least 65% of new tread height.

## BELT OR POWER TAKE-OFF PERFORMANCE

**Maximum Power and Fuel Consumption.** The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

**Varying Power and Fuel Consumption.** Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque,  $\frac{1}{2}$  of the 85% torque; maximum power,  $\frac{1}{4}$  and  $\frac{3}{4}$  of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

## DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests.

**Varying Power and Fuel Consumption With Ballast.** The varying power runs are made to show the effect of speed-control devices (engine, governor, automatic trans-

mission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power.

**Maximum Power with Ballast.** Maximum power is measured on straight level sections of the test course. Data are shown for not more than 8 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The manufacturer's representative has the option of selecting one gear or speed over eight miles per hour. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

**Maximum Pull without Ballast.** All added ballast is removed from the tractor. The drawbar pull is determined at slip limits of 15% for pneumatic tires or 7% for steel tracks or lugs. The tractor is operated at the fastest possible travel speed.

**Varying Drawbar Pull and Travel Speed with Ballast.** Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the Nebraska Tractor Tests write to the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska 68503.



OLIVER 1855 DIESEL