

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

---

8-3-1959

## Test 712: Case Model 1010 (Diesel)

Nebraska Tractor Test Lab

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

Follow this and additional works at: <https://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Energy Systems Commons](#), [History of Science, Technology, and Medicine Commons](#), [Other Mechanical Engineering Commons](#), [Physical Sciences and Mathematics Commons](#), [Science and Mathematics Education Commons](#), and the [United States History Commons](#)

---

Nebraska Tractor Test Lab, "Test 712: Case Model 1010 (Diesel)" (1959). *Nebraska Tractor Tests*. 1137. <https://digitalcommons.unl.edu/tractormuseumlit/1137>

This Article is brought to you for free and open access by the Tractor Test and Power Museum, The Lester F. Larsen at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Tractor Tests by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

# NEBRASKA TRACTOR TEST NO. 712 - CASE 1010 DIESEL

The University of Nebraska Agricultural Experiment Station

W. V. Lambert, Director; Lincoln, Nebraska

## DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank shaft speed rpm	% Slip of drive wheels	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
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—2nd Gear											
52.91	7546	2.63	1897	1.56	6.309	0.836	8.39	203	76	95	28.815
75% of Pull at Maximum Power—Ten Hours—2nd Gear											
49.96	6109	3.07	2077	1.58	6.560	0.920	7.62	199	75	90	28.814
50% of Pull at Maximum Power—Two Hours—2nd Gear											
36.52	4009	3.42	2192	0.99	5.431	1.042	6.72	195	76	98	28.785
MAXIMUM POWER WITH BALLAST											
54.57	15260	1.34	1855	5.96	1st Gear.....			186	72	85	28.870
55.51	8170	2.55	1883	1.44	2nd Gear.....			186	74	84	28.820
55.26	6908	3.00	1885	1.51	3rd Gear.....			185	74	86	28.810
50.80	3790	5.03	1839	0.64	4th Gear.....			168	75	81	28.820
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—2nd Gear											
Pounds pull			8150		9550		11250		13100		14750
Horsepower			55.5		56.0		51.0		45.4		31.5
Miles per hour			2.6		2.2		1.7		1.3		0.8

Department of Agricultural Engineering

Dates of Test: August 14 to August 28, 1959

Manufacturer: J. I. CASE COMPANY, RACINE, WISCONSIN

Manufacturer's Power Rating: Not Rated

FUEL, OIL, and TIME Fuel No. 2 Diesel Cetane No 51 (ratings taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8418 Weight per gallon 7.009 lb Oil SAE 40 API service classification DG and MS To motor 2.236 gal Drained from motor 1.732 gal Transmission lubricant type "C" torque converter oil Final-drive lubricant SAE No 140 Type transmission gear lube Total time motor was operated 39 hours.

ENGINE Make Continental diesel Type 4 cylinder vertical Serial No 15537 Crankshaft mounted length-wise Rated rpm 2250 Lubrication pressure Bore and stroke 4½" x 6" Compression ratio 15.0 to 1 Displacement 382 cu in Cranking system 24 volts (four 6 volt batteries) Air cleaner oil washed wire screen Muffler was used Oil filter replaceable paper element Fuel filter one primary filter with replaceable cotton element, one secondary filter with replaceable pleated paper element and one final replaceable paper disc filter Cooling medium temperature control thermostat.

CHASSIS Type tracklayer Serial No 7101713 Tread width 60" Wheel base 79" Drawbar height 15" Measured length of track 20.3 feet Cleats integral with shoes Cleats per track 39 Size of cleats 16" x 2" 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 37½" Vertical distance above roadway 27½" Horizontal distance from center of rear wheel tread 0" to the right or left Hydraulic control system direct engine drive Transmission two range fixed ratio with eight hydraulically controlled multiple disc clutches Advertised speeds mph first 0 to 1.6 second 0 to 2.9 third 0 to 3.3 fourth 0 to 6.0 reverse first 0 to 1.9 second 0 to 3.5 third 0 to 4.0 fourth 0 to 7.2 Clutches multiple disc operated hydraulically by hand levers or brake pedals Brakes foot pedals operating disc brakes hydraulically and hand lever for parking Steering by clutch levers controlling power shifting in two speed ranges, forward or reverse, for each track independently or by brake pedals Turning space diameter (with brake applied) right 174" left 174".

Total weight with operator 17,105 pounds including drawbar assembly 175 lbs, and rock guards 546 lbs.

REPAIRS AND ADJUSTMENTS During maximum drawbar horsepower runs the manual throttle control mechanism came apart. This was repaired and test continued.

REMARKS All test results were determined from observed data obtained in accordance with SAE and ASAE test code. No belt pulley or power take-off available for this tractor, therefore no belt or power take-off performance tests. This tractor is equipped with an operator controlled power shifting partial range transmission with torque multiplier.

We, the undersigned, certify that this a true and correct report of official Tractor Test No 712.

L. F. LARSEN  
Engineer-in-Charge

L. W. HURLBUT  
G. W. STEINBRUEGGE  
J. J. SULEK  
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. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

## 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,  $\frac{1}{2}$  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. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

**Varying Power and Fuel Consumption With Ballast.** The varying power runs are made to show the effect of speed-control devices (engine governor, automatic transmissions, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree

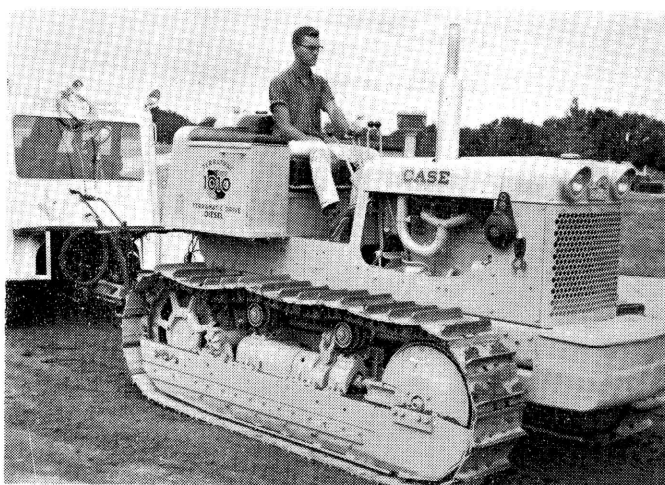
turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

**Maximum Power with Ballast.** Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 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 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 Power Without Ballast.** All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

**Varying Power 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.



Case 1010 Diesel