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Test 692: Case Model 900-B (Diesel)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 692 - CASE 900-B DIESEL

University of Nebraska Agricultural Experiment Station

W. V. Lambert, Director, Lincoln, Nebraska

POWER TAKE-OFF PERFORMANCE

Hp	Crank shaft speed rpm	Fuel Consumption		Hp-hr per gal	Temperature Degrees F			Barometer inches of mercury	
		Gal per hr	Lb per hp-hr		Cooling medium	Air wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours									
70.24	1500	4.793	0.478	14.65	212	56	75	29.082	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
62.72	1575	4.011	0.448	15.64	201	57	76	
0.73	1668	1.207	11.59	0.60	183	53	69	
32.37	1626	2.568	0.556	12.61	187	56	75	
71.39	1501	4.777	0.469	14.94	210	58	78	
16.33	1640	1.947	0.836	8.39	184	56	73	
47.94	1606	3.202	0.468	14.97	191	57	75	
Av	38.58	1603	2.952	0.536	13.07	192	56	74	29.087

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank shaft speed rpm	% Slip of drive wheels	Fuel Consumption		Hp-hr per gal	Temp. Degrees F			Barometer inches of mercury
					Gal per hr	Lb per hp-hr		Cooling med	Air wet bulb	Air dry bulb	
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—3rd Gear											
66.21	5527	4.49	1509	4.44	4.857	0.514	13.63	192	45	50	28.738
75% of Pull at Maximum Power—Ten Hours—3rd Gear											
52.58	4140	4.76	1586	3.50	3.819	0.509	13.77	191	58	67	28.716
50% of Pull at Maximum Power—Two Hours—3rd Gear											
36.13	2753	4.92	1617	2.18	2.950	0.572	12.25	184	55	61	28.755
MAXIMUM POWER WITH BALLAST											
60.05	9391	2.40	1557	14.56	1st Gear.....		189	46	54		29.050
64.98	6949	3.51	1504	6.64	2nd Gear.....		193	46	54		29.050
65.59	5509	4.46	1501	4.41	3rd Gear.....		194	48	54		28.760
65.30	4448	5.51	1498	3.99	4th Gear.....		194	46	54		29.050
64.94	3583	6.80	1500	3.29	5th Gear.....		195	51	60		29.035
57.09	1590	13.46	1502	1.63	6th Gear.....		193	51	60		29.035
MAXIMUM POWER WITHOUT BALLAST											
63.23	5404	4.39	1505	6.65	3rd Gear.....		198	67	72		28.700
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—3rd Gear											
Pounds pull		5500	5700	5900	5900	5700	5400				
Horsepower		65.6	60.8	56.6	48.8	41.0	31.7				
Miles per hour		4.5	4.0	3.6	3.1	2.7	2.2				

Department of Agricultural Engineering

Dates of Test: April 20 to April 29, 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 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8418 Weight per gallon 7.009 lb Oil SAE 10W API service classification MM, MS, and DG To motor 2.997 gal Drained from motor 2.411 gal Transmission and final-drive lubricant SAE No 90 Type MP Total time motor was operated 40½ hours.

ENGINE Make Case Diesel Type 6 cylinder vertical Serial No 8123655 Crankshaft mounted lengthwise Rated rpm 1500 Lubrication pressure Bore and stroke 4" x 5" Compression ratio 15 to 1 Displacement 377 cu in Cranking system 12 volts (two 6 volt batteries) Air cleaner oil washed wire mesh Muffler was used Oil filter replaceable wood cellulose element Fuel filter one edge wound metal filter removable for cleaning, one filter with replaceable element and one replaceable sealed filter Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No 8123655 Tread width rear 67½" front 54¾" Wheel base 84" 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 24" Vertical distance above roadway 33" Horizontal distance from center of rear wheel tread 0" to the right or left Hydraulic control system direct engine drive Advertised speeds mph first 2.7 second 3.8 third 4.8 fourth 5.8 fifth 7.1 sixth 13.9 reverse 3.2 Belt pulley diam 13½" face 8¼" rpm 944 Belt speed 3338 fpm Clutch over-center oil cushion operated by hand lever Brakes double disc operated by two foot pedals Power take-off 549 rpm at 1500 engine rpm Steering power assisted Turning radius (on concrete surface with brake applied) right 135½" left 135" (on concrete surface without brake) right 192½" left 194" Turning space diameter (on concrete surface with brake applied) right 282½" left 281½" (on concrete surface without brake) right 396" left 399".

REPAIRS AND ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with SAE and test code.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No 692.

L. F. LARSEN
Engineer-in-Charge

L. W. HURLBUT, Chairman
G. W. STEINBRUEGGE
J. J. SULEK
Board of Tractor
Test Engineers

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 18-26;8;12	Two 18-26;8;12
Ballast	—Liquid	1100 lb each	None
	—Cast iron	1040 lb each	None
Front tires	—No, size, ply & psi	Two 7.50-18;6;28	Two 7.50-18;6;28
Ballast	—Liquid	135 lb each	None
	—Cast iron	50 lb each	None
Height of drawbar		18 inches	18½ inches
Static weight	—Rear	10,200 lb	5,920 lb
	—Front	2,800 lb	2,430 lb
Total weight with operator		13,175 lb	8,525 lb

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 900-B Diesel