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## Test 694: Case Model 711-B (LPG)

Nebraska Tractor Test Lab

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

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# NEBRASKA TRACTOR TEST 694 – CASE 711-B LPG

University of Nebraska Agricultural Experiment Station

W. V. Lambert, Director, Lincoln, Nebraska

## POWER TAKE-OFF PERFORMANCE

Hp	Crank shaft speed rpm	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temperature Cooling medium	Degrees F Air wet bulb	Air dry bulb	Barometer inches of Mercury
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### MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—Two Hours								
53.31	1500	5.441	0.434	9.80	185	61	75	29.215
Standard Power Take-Off Speed (540 rpm)—One Hour								
52.07	1451	5.256	0.429	9.91	186	62	76	29.235

### VARYING POWER AND FUEL CONSUMPTION—TWO HOURS

47.89	1586	5.040	0.447	9.50	179	60	73	.....	
0.96	1725	1.602	7.094	0.60	166	62	78	.....	
24.68	1634	3.289	0.566	7.50	170	60	74	.....	
54.06	1501	5.534	0.435	9.77	183	61	75	.....	
14.82	1667	2.584	0.741	5.74	168	60	73	.....	
42.26	1587	4.624	0.465	9.14	175	61	76	.....	
Av	30.78	1616	3.779	0.522	8.15	173	61	75	29.257

## 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 Cool- ing med	Degrees F Air wet bulb	Air dry bulb	Barometer inches of Mercury
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### VARYING DRAWBAR POWER & FUEL CONSUMPTION WITH BALLAST

Maximum Available Power—Two Hours—5th Gear											
47.96	3800	4.73	1499	5.19	5.474	0.485	8.76	175	57	63	29.350
75% of Pull at Maximum Power—Ten Hours—5th Gear											
39.02	2865	5.11	1590	3.64	4.797	0.522	8.13	175	61	64	29.156
50% of Pull at Maximum Power—Two Hours—5th Gear											
27.40	1945	5.28	1625	2.41	3.762	0.584	7.28	173	61	64	29.350

### MAXIMUM POWER WITH BALLAST

35.08	7493	1.76	1597	14.06	2nd Gear	.....	177	67	82	28.800
44.66	7260	2.31	1517	14.11	3rd Gear	.....	175	62	64	29.300
48.30	5071	3.57	1500	7.03	4th Gear	.....	175	62	64	29.300
48.34	3827	4.74	1499	5.15	5th Gear	.....	174	53	60	29.350
48.25	2629	6.88	1500	3.27	6th Gear	.....	173	60	64	29.365
45.76	1794	9.57	1503	2.12	7th Gear	.....	177	62	66	29.320
42.64	1144	13.98	1508	1.39	8th Gear	.....	173	62	66	29.320

### MAXIMUM POWER WITHOUT BALLAST

42.37	3361	4.73	1502	5.48	5th Gear	.....	169	48	58	29.000
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### VARYING DRAWBAR PULL & TRAVEL SPEED WITH BALLAST—5th Gear

Pounds pull	3850	3850	3950	3900	3900	3600
Horsepower	48.3	44.1	40.0	34.3	30.2	23.0
Miles per hour	4.7	4.3	3.8	3.3	2.9	2.4

### TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 15.5-38;6;18	Two 15.5-38;6;14
Ballast	—Liquid	653 lb each	None
	—Cast iron	685 lb each	None
Front tires	—No, Size, ply & psi	Two 6.00-16;6;32	Two 6.00-16;6;32
Ballast	—Liquid	None	None
	—Cast iron	None	None
Height of drawbar		17 inches	18 inches
Static weight	—Rear	7005 lb	4330 lb
	—Front	1950 lb	1946 lb
Total weight with operator		9130 lb	6451 lb

Department of Agricultural Engineering

Dates of Test: April 22 to May 15, 1959

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

Manufacturer's Power Rating: Not Rated

**FUEL, OIL and TIME** Fuel Commercial Propane Specific gravity converted to 60°/60° 0.5103 Weight per gallon 4.25 lb Oil SAE 10W API service classification MM, MS and DG To motor 2.229 gal Drained from motor 1.666 gal Transmission and final-drive lubricant SAE No 90 Type MP Total time motor was operated 40 hours.

**ENGINE** Make Case LPG Type 4 cylinder vertical Serial No 8131213 Crankshaft mounted lengthwise Rated rpm 1500 Lubrication pressure Bore and stroke 4" x 5" Compression ratio 8.0 to 1 Displacement 251 cu in Carburetor size 1 1/4" Ignition system battery Cranking system 12 volt battery Air cleaner oil washed wire mesh Muffler was used Oil filter replaceable wood cellulose element Cooling medium temperature control thermostat.

**CHASSIS** Type tricycle Serial No 8131213 Tread width rear 52" to 88" front 9 1/8" to 15 1/8" Wheel base 92 1/4" 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 28 5/16" Vertical distance above roadway 35" Horizontal distance from center of rear wheel tread 0" to the right or left Hydraulic control system direct engine drive Advertised speeds mph first 1.4 second 1.9 third 2.7 fourth 3.8 fifth 4.8 sixth 6.9 seventh 9.4 eighth 13.7 reverse 1.7 and 6.2 Belt pulley diam 10 1/2" face 7 1/4" rpm 1166 Belt speed 3205 fpm Clutch single plate dry disc operated by foot pedal Brakes double disc operated by two foot pedals Power take-off 540 rpm at 1450 engine rpm Steering power assisted Turning radius (on concrete surface with brake applied) right 100 1/2" left 101" (on concrete surface without brake) right 103 1/2" left 103" Turning space diameter (on concrete surface with brake applied) right 221" left 221 1/2" (on concrete surface without brake) right 226" left 226".

**REPAIRS AND ADJUSTMENTS** No repairs or adjustments.

**REMARKS** All test results were determined from observed data obtained in accordance with SAE and ASAE test code. First gear was not run as it was necessary to limit the pull in second gear to avoid excessive wheel slippage.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No 694.

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

## 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 useage.

## 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 711-B LPG Test 694