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Test 778: Case 741C (Gasoline)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 778 - CASE 741C GASOLINE

The University of Nebraska Agricultural Experiment Station

E. F. Frolik, Dean and Acting 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	Cooling med	Temp Degrees F Air wet bulb	Air dry bulb	Barometer inches of mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
57.88	1900	5.079	0.540	11.40	182	59	76	29.335
Standard Power Take-off Speed (540 rpm)—One Hour								
55.22	1682	4.682	0.522	11.79	179	58	75	29.305
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
50.62	1957	4.669	0.568	10.84	174	59	75	.....
0.00	2069	2.061	.....	.....	169	56	72	.....
25.99	2009	3.304	0.783	7.87	173	58	75	.....
57.71	1900	5.073	0.541	11.38	185	59	77	.....
13.26	2049	2.690	1.249	4.93	173	60	77	.....
38.51	1984	3.977	0.636	9.68	174	60	76	.....
Av 31.02	1994	3.629	0.720	8.55	175	59	75	29.243

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	Temperature Degrees F Cooling medium	Air wet bulb	Air dry bulb	Barometer inches of mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—4th Gear											
50.58	4083	4.65	1904	4.35	5.165	0.629	9.79	185	28	31	29.313
45.11	4979	3.40	1825	5.61	4.972	0.679	9.07	188	37	43	Torq. Conv.
75% of Pull at Maximum Power—Ten Hours and Two Hours—4th Gear											
40.43	3090	4.91	1992	3.51	4.533	0.690	8.92	170	26	27	29.336
39.63	3739	3.98	1963	4.00	5.006	0.778	7.92	187	38	44	Torq. Conv.
50% of Pull at Maximum Power—Two Hours—4th Gear											
27.38	2043	5.03	2013	2.19	3.803	0.855	7.20	171	20	21	29.295
26.87	2460	4.10	2001	2.52	3.973	0.910	6.76	187	35	41	Torq. Conv.
MAXIMUM POWER WITH BALLAST											
43.16	7512	2.15	1959	14.51	2nd Gear	.....	165	23	23	29.360	
49.20	6011	3.07	1901	8.35	3rd Gear	.....	169	23	23	29.360	
50.38	4098	4.61	1904	5.20	4th Gear	.....	183	24	25	29.380	
49.05	3032	6.07	1900	3.83	5th Gear	.....	181	24	26	29.390	
48.06	2049	8.80	1902	2.33	6th Gear	.....	181	32	35	29.280	
45.26	1395	12.17	1908	1.46	7th Gear	.....	180	34	38	29.230	
34.87	7497	1.74	1973	14.73	2nd Gear	Torq. Conv.	166	23	23	29.360	
42.67	6866	2.33	1851	10.82	3rd Gear	Torq. Conv.	171	23	23	29.360	
45.04	5003	3.38	1831	6.34	4th Gear	Torq. Conv.	185	23	23	29.360	
44.74	4007	4.19	1812	5.00	5th Gear	Torq. Conv.	183	24	26	29.390	
44.16	2690	6.16	1806	2.77	6th Gear	Torq. Conv.	184	32	35	29.280	
42.78	1930	8.31	1801	2.12	7th Gear	Torq. Conv.	180	34	38	29.230	
MAXIMUM POWER WITHOUT BALLAST											
48.96	4015	4.57	1899	5.70	4th Gear	.....	185	56	58	28.800	
43.45	4951	3.29	1819	9.07	4th Gear	Torq. Conv.	185	56	58	28.800	
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—4th Gear											
Pounds pull	4100	4450	4700	4850	4850	5000	4850				
Horsepower	50.4	48.7	45.1	40.1	34.9	30.7	23.3				
Miles per hour	4.6	4.1	3.6	3.1	2.7	2.3	1.8				
Pounds pull (Torq. Conv.)	5000	5450	5950	6500	7050	7700					
Horsepower (Torq. Conv.)	45.0	45.1	42.8	41.6	37.6	34.9					
Miles per hour (Torq. Conv.)	3.4	3.1	2.7	2.4	2.0	1.7					

Department of Agricultural Engineering

Dates of Test: November 2 to November 12, 1960

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

Manufacturer's Power Rating: Not Rated

FUEL, OIL and TIME Fuel regular gasoline Octane No Motor 84 Research 92 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.7395 **Weight per gallon** 6.156 lb **Oil SAE 10W API service classification MS, DG To motor** 1.727 gal **Drained from motor** 1.329 gal **Transmission and final-drive lubricant SAE 10W Type engine oil** **Total time engine was operated** 42½ hours.

ENGINE Make Case gasoline **Type** 4 cylinder vertical **Serial No** 816 1051 **Crankshaft mounted lengthwise** **Rated rpm** 1900 **Bore and stroke** 4" x 5" **Compression ratio** 6.88 to 1 **Displacement** 251 cu in **Carburetor size** 1¼" **Ignition system** battery **Cranking system** 12 volt electric **Lubrication pressure** **Air cleaner oil** washed wire mesh **Oil filter** replaceable **pleated paper element** **Oil cooler engine coolant heat exchanger for torque converter oil** **Muffler** was used **Cooling medium temperature control thermostat and radiator shutter.**

CHASSIS Type standard **Serial No** 816 1051 **Tread width rear** 52" to 88" **front** 53" to 82" **Wheel base** 101¼" **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** 31.6" **Vertical distance above roadway** 35.8" **Horizontal distance from center of rear wheel tread 0" to the right/left** **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio plus torque converter with lockout **Advertised speeds mph** first 1.7 second 2.4 third 3.3 fourth 4.8 fifth 6.2 sixth 8.9 seventh 12.1 eighth 17.6 reverse 2.2 and 8.0 **Clutch** multiple disc main power clutch actuated hydraulically by foot pedal and a single disc clutch engaging engine directly with power clutch and transmission actuated hydraulically by hand lever **Brakes** double disc operated independently by foot pedals which can be locked together **Steering power assisted** **Turning radius** (on concrete surface with brake applied) right 148" left 145" (on concrete surface without brake right 191" left 190" **Turning space diameter** (on concrete surface with brake applied) right 306" left 302" (on concrete surface without brake) right 390" left 390" **Belt pulley** 1027 rpm at 1900 engine rpm diam 10½" face 7¼" **Belt speed** 2820 fpm **Power take-off** 545 rpm at 1700 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 gear direct drive and first gear torque converter were not run as it was necessary to limit the pull in second gear direct drive and second gear torque converter to avoid excessive wheel slippage. Eighth gear direct drive was not run as it exceeded 15 mph and eighth gear torque converter was not run as only 12 gears, selected by the manufacturer's representative, are used in making the maximum power runs with ballast.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 778.

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 15.5-38;8;20
Ballast	—Liquid	520 lb each
	—Cast iron	720 lb each
Front tires	—No, size, ply & psi	Two 6.00-16;6;36
Ballast	—Liquid	None
	—Cast iron	None
Height of drawbar		19 inches
Static weight	—Rear	7350 lb
	—Front	2030 lb
Total weight with operator		9555 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 741C Gasoline