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Test 777: Case 841C (Gasoline)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 777 - CASE 841C 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	Temp Degrees F	Air wet bulb	Air dry bulb	Barometer inches of mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
65.64	1900	5.818	0.546	11.28	192	58	75	29.107
Standard Power Take-off Speed (540 rpm)—One Hour								
63.78	1682	5.393	0.521	11.83	192	58	75	29.130
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
57.94	1974	5.492	0.584	10.55	189	59	77	.....
0.00	2169	2.344	.....	.....	182	57	73	.....
29.54	2016	3.826	0.797	7.72	188	58	76	.....
65.74	1900	5.799	0.543	11.34	193	58	76	.....
15.09	2056	3.134	1.278	4.81	183	57	74	.....
43.90	1995	4.639	0.651	9.46	189	58	75	.....
Av 35.37	2018	4.206	0.732	8.41	187	58	75	29.180

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 Cooling medium	Degrees F 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														
58.41	4716	4.64	1904	4.48	5.875	0.619	9.94	183	43	51	28.713			
54.03	5633	3.60	1915	5.47	5.837	0.665	9.26	184	41	48	Torq. Conv.			
75% of Pull at Maximum Power—Ten Hours and Two Hours—4th Gear														
47.78	3620	4.95	2009	3.56	5.235	0.675	9.13	175	38	43	28.924			
47.33	4438	4.00	1983	4.20	5.681	0.739	8.33	180	41	45	Torq. Conv.			
50% of Pull at Maximum Power—Two Hours—4th Gear														
32.87	2436	5.06	2026	2.18	4.288	0.803	7.67	165	43	49	28.670			
32.45	2935	4.15	2013	2.58	4.615	0.876	7.03	170	38	41	Torq. Conv.			
MAXIMUM POWER WITH BALLAST														
49.20	8474	2.18	1985	14.96	2nd Gear			175	46	55	29.170			
56.69	6957	3.06	1900	8.80	3rd Gear			180	46	55	29.170			
59.81	4875	4.60	1903	5.34	4th Gear			178	41	48	29.095			
58.50	3594	6.10	1898	3.26	5th Gear			180	40	46	28.910			
56.52	2419	8.76	1897	2.40	6th Gear			180	40	46	28.910			
54.64	1693	12.10	1898	1.60	7th Gear			180	40	46	28.910			
47.56	8411	2.12	1891	14.79	3rd Gear	Torq.	Conv.	176	46	55	29.170			
53.17	5878	3.39	1900	6.80	4th Gear	Torq.	Conv.	180	41	48	29.095			
53.16	4499	4.43	1885	4.24	5th Gear	Torq.	Conv.	180	40	46	28.910			
53.16	3144	6.34	1883	2.76	6th Gear	Torq.	Conv.	183	40	46	28.910			
51.70	2399	8.08	1865	2.33	7th Gear	Torq.	Conv.	181	40	46	28.910			
48.99	1838	9.99	1824	1.75	8th Gear	Torq.	Conv.	178	40	46	28.910			
MAXIMUM POWER WITHOUT BALLAST														
56.97	4728	4.52	1904	6.93	4th Gear			185	42	46	28.800			
49.69	5153	3.62	1920	8.91	4th Gear Torq.			Conv.	185	42	46	28.800		
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—4th Gear														
Pounds pull		4900		5200		5550		5650		5750		5800	5800	
Horsepower		59.8		56.9		53.3		48.2		41.4		35.6		27.8
Miles per hour		4.6		4.1		3.6		3.2		2.7		2.3		1.8
Pounds pull (Torq. Conv.)		5900		6300		6950		7700		8450				
Horsepower (Torq. Conv.)		53.2		52.1		50.0		47.2		42.8				
Miles per hour (Torq. Conv.)		3.4		3.1		2.7		2.3		1.9				

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 15.5-38;8;24	Two 15.5-38;8;14
Ballast	—Liquid	635 lb each	None
	—Cast iron	1150 lb each	None
Front tires	—No, size, ply & psi	Two 6.00-16;6;36	Two 6.00-16;6;36
Ballast	—Liquid	None	None
	—Cast iron	None	None
Height of drawbar		18½ inches	19 inches
Static weight	—Rear	8660 lb	5090 lb
	—Front	2050 lb	2060 lb
Total weight with operator		10,885 lb	7325 lb

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 take 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 1.933 gal **Drained from motor** 1.693 gal **Transmission and final-drive lubricant** SAE 10W **Type engine oil** Total time engine was operated 51 hours.

ENGINE Make Case gasoline Type 4 cylinder vertical Serial No 816 1057 **Crankshaft** mounted lengthwise **Rated rpm** 1900 **Bore and stroke** 4¼" x 5" **Compression ratio** 7.4 to 1 **Displacement** 284 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 1057 **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 30.8" **Vertical distance** above roadway 35.42" **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 137" left 138" (on concrete surface without brake) right 191" left 190" **Turning space diameter** (on concrete surface with brake applied) right 285" left 288" (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, first and second gear torque converter were not run as it was necessary to limit the pull in second gear direct drive and third gear torque converter to avoid excessive wheel slippage. Eighth gear direct drive was not run as it exceeded 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 777.

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 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 841C Gasoline