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Test 781: Case 741C (LPG)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 781 - CASE 741C LPG

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 Cool- ing med	Air wet bulb	Air dry bulb	Barometer inches of mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
57.19	1900	7.222	0.537	7.92	193	56	75	28.893
Standard Power Take-off Speed (540 rpm)—One Hour								
54.94	1682	6.496	0.503	8.46	190	55	74	28.880
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
50.37	1968	6.685	0.564	7.53	192	56	75	.....
0.00	2063	2.711	.....	.....	187	54	72	.....
25.71	2011	4.574	0.756	5.62	191	56	74	.....
57.00	1900	6.805	0.507	8.38	198	56	74	.....
13.28	2045	3.720	1.191	3.57	185	56	75	.....
37.95	1979	5.449	0.610	6.96	194	58	78	.....
Av 30.72	1994	4.991	0.691	6.16	191	56	75	28.880

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 drv bulb	Barometer inches of mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—4th Gear											
51.98	4241	4.60	1900	4.83	7.021	0.574	7.40	189	40	50	28.925
45.10	4971	3.40	1815	5.37	6.380	0.601	7.07	191	45	55	Torq. Conv.
75% of Pull at Maximum Power—Ten Hours and Two Hours—4th Gear											
42.60	3250	4.92	1997	3.12	6.220	0.621	6.85	188	40	49	28.850
39.66	3721	4.00	1981	3.86	6.515	0.698	6.09	189	38	47	Torq. Conv.
50% of Pull at Maximum Power—Two Hours—4th Gear											
29.50	2192	5.05	2033	2.31	5.248	0.756	5.62	177	38	47	28.958
27.05	2480	4.09	2009	2.59	5.353	0.841	5.05	182	36	41	Torq. Conv.
MAXIMUM POWER WITH BALLAST											
44.62	7626	2.19	2004	14.72	2nd Gear			174	38	44	28.910
49.95	6110	3.07	1903	8.24	3rd Gear			182	38	44	28.930
52.45	4307	4.57	1896	5.23	4th Gear			187	38	44	28.925
50.67	3140	6.05	1901	3.72	5th Gear			186	38	44	28.925
50.34	2158	8.75	1905	2.45	6th Gear			185	39	48	28.925
47.12	1468	12.04	1903	1.73	7th Gear			184	39	48	28.925
36.37	7621	1.79	2010	14.72	2nd Gear Torq. Conv.			176	38	44	28.910
44.79	7038	2.39	1871	10.47	3rd Gear Torq. Conv.			180	38	44	28.930
46.70	4913	3.56	1865	6.24	4th Gear Torq. Conv.			186	38	44	28.925
45.26	3739	4.54	1833	4.48	5th Gear Torq. Conv.			185	38	44	28.925
45.21	2609	6.50	1828	3.02	6th Gear Torq. Conv.			185	38	44	28.925
43.50	2027	8.05	1793	2.52	7th Gear Torq. Conv.			183	39	48	28.925
MAXIMUM POWER WITHOUT BALLAST											
50.38	4153	4.55	1896	5.74	4th Gear			175	47	58	28.940
45.12	4988	3.39	1835	8.03	4th Gear Torq. Conv.			175	46	58	28.940
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—4th Gear											
Pounds pull			4300	4550	4700			4700	4550		4450
Horsepower			52.5	49.7	45.1			40.1	32.8		27.3
Miles per hour			4.6	4.1	3.6			3.2	2.7		2.3
Pounds pull (Torq. Conv.)			4900	5400	6000			6550	7050		7650
Horsepower (Torq. Conv.)			46.7	46.1	44.8			43.7	39.5		36.7
Miles per hour (Torq. Conv.)			3.6	3.2	2.8			2.5	2.1		1.8

TIRES, BALLAST and WEIGHT

Rear tires	—No, size, ply & psi	Two 15.5-38;8;20	Two 15.5-38;8;14
Ballast	—Liquid	610 lb each	None
	—Cast iron	720 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		19 inches	19 inches
Static weight	—Rear	7620 lb	4960 lb
	—Front	2080 lb	2110 lb
Total weight with operator		9875 lb	7245 lb

Department of Agricultural Engineering

Dates of Test: November 4 to November 19, 1960

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 MS, DG To motor 2.176 gal Drained from motor 1.713 gal Transmission and final-drive lubricant SAE 10W Type engine oil Total time engine was operated 52 hours.

ENGINE Make Case LPG Type 4 cylinder vertical Serial No 816 1053 Crankshaft mounted lengthwise Rated rpm 1900 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 electric Lubrication pressure Air cleaner oil washed wire mesh Oil filter replaceable pleated element Oil cooler engine coolant heat exchanger for torque converter oil Fuel filter replaceable pleated paper element Muffler was used Cooling medium temperature control thermostat and radiator shutter.

CHASSIS Type standard Serial No 816 1053 Tread width rear 52" to 88" front 53" to 82" Wheel base 101 3/4" 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 31.6" Vertical distance above roadway 35.4" 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 10 1/2" face 7 1/4" 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 torque converter and first gear direct drive were not run as it was necessary to limit the pull in second gear torque converter and second gear direct drive 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 781.

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

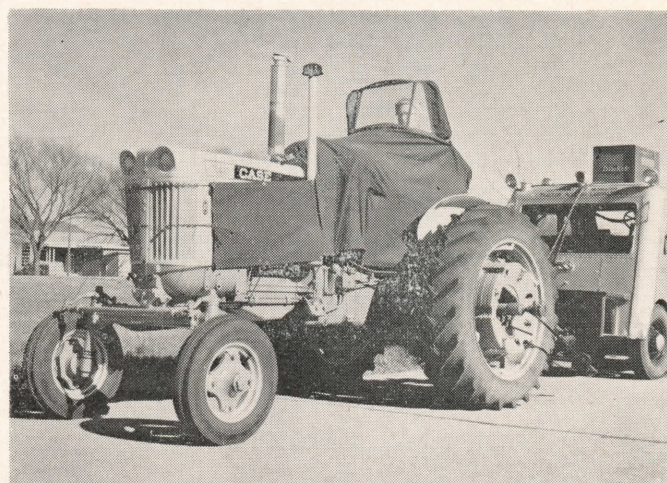
turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum 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 741C LPG