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Test 877: Ford Commander 6000 (Gasoline)

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

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NEBRASKA TRACTOR TEST 877 - FORD COMMANDER 6000 GASOLINE

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									
66.26	2430	6.310	0.579	10.50	200	56	75	28.983	
Standard Power Take-off Speed (1000 rpm)—One Hour									
62.39	2227	5.851	0.570	10.66	194	58	75	28.980	
Standard Power Take-off Speed (1000 rpm)—One Hour									
51.59	1731	4.664	0.550	11.06	191	59	75	29.010	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
59.28	2557	6.515	0.669	9.10	194	59	76	.....
0.00	2706	2.422	.....	.....	166	58	73	.....
30.68	2648	4.143	0.821	7.41	186	59	76	.....
65.91	2431	6.298	0.581	10.47	204	60	76	.....
15.58	2691	3.255	1.271	4.79	178	59	74	.....
44.87	2581	5.040	0.683	8.90	192	59	75	.....
Av	36.05	2602	4.612	0.778	7.82	187	59	75	28.993

DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Slip of drivers %	Fuel Consumption		Temp Degrees F					Barom- eter inches of Mercury
					Gal per hr	Lb per hp-hr	Hp-hr per gal	Cool- ing med	Air wet bulb	Air dry bulb		
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST												
Maximum Available Power—Two Hours—5th Gear												
56.42	5185	4.08	2431	8.47	6.243	0.673	9.04	200	56	74	29.000	
75% of Pull at Maximum Power—Ten Hours—5th Gear												
47.75	4023	4.45	2569	5.49	6.114	0.779	7.81	194	61	78	28.944	
50% of Pull at Maximum Power—Two Hours—5th Gear												
33.07	2663	4.66	2625	3.18	4.808	0.884	6.88	190	62	85	28.865	
MAXIMUM POWER WITH BALLAST												
49.89	7436	2.52	2517	12.81	4th Gear			177	56	76	28.970	
57.75	5334	4.06	2429	8.84	5th Gear			192	55	65	29.040	
58.24	4059	5.38	2438	6.36	6th Gear			192	55	65	29.040	
57.81	3472	6.24	2431	5.23	7th Gear			190	55	70	29.040	
56.61	2606	8.15	2434	4.01	8th Gear			190	56	71	29.040	
53.39	1501	13.34	2423	2.40	9th Gear			195	56	72	29.030	
MAXIMUM POWER WITHOUT BALLAST												
54.73	5138	3.99	2434	10.29	5th Gear	.....		196	66	79	28.820
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—5th Gear												
Pounds pull				5334	5488	5713	5757	5797	5709			
Horsepower				57.75	53.30	49.18	42.86	37.07	30.66			
Crankshaft Speed, rpm				2429	2190	1947	1688	1449	1220			
Miles per hour				4.06	3.64	3.23	2.79	2.40	2.01			
Slip of drivers, %				8.84	9.46	9.70	9.94	9.82	10.19			

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
	—Liquid	565 lb each	None
	Cast iron	780 lb each	None
Front tires	—No, size, ply & psi	Two 6.50-16; 6; 32	Two 6.50-16; 6; 32
	—Liquid	None	None
	Cast iron	60 lb each	None
Height of drawbar		22 inches	22½ inches
Static weight	—Rear	7320 lb	4630 lb
	—Front	2160 lb	2025 lb
Total weight with operator		9655 lb	6830 lb

Department of Agricultural Engineering

Dates of Test: MARCH 15 TO MAY 13, 1965

Manufacturer: FORD MOTOR COMPANY, BIRMINGHAM, MICHIGAN

FUEL, OIL and TIME Fuel regular gasoline Octane No Motor 85.2 Research 92.3 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7308 Weight per gallon 6.083 lb Oil SAE 10W API service classification MS, DM To motor 1.229 gal Drained from motor 0.906 gal Transmission lubricant Ford Oil ESNM2C41-A Final drive lubricant Ford Oil ESNM2C53-A Total time engine was operated 44½ hours.

ENGINE Make Ford gasoline Type 6 cylinder vertical Serial No TG-000050M4 Crankshaft mounted lengthwise Rated rpm 2430 Bore and stroke 3.62" x 3.60" Compression ratio 8.4 to 1 Displacement 223 cu in Carburetor size 1¼ Ignition system battery Cranking system 12 volt electric Lubrication pressure Air cleaner oil washed wire mesh with centrifugal pre-cleaner Oil filter replaceable treated paper cartridge Oil cooler heat exchanger in lower radiator tank for transmission oil Fuel filter screen in sediment bowl Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type tricycle Serial No C100006 Tread width rear 56" to 84" front 8.3" or 16.3" Wheel base 95.5" Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from centerline of rear wheels 28.0" Vertical distance above roadway 35.5" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system direct engine drive with accumulator Transmission selective gear fixed ratio with operator controlled full range power shifting Advertised speeds mph first 1.3 second 1.9 third 2.0 fourth 2.8 fifth 4.4 sixth 5.7 seventh 6.6 eighth 8.5 ninth 13.7 tenth 19.9 reverse 3.9 and 5.8 Clutch multiple disc wet clutches within transmission hydraulically operated Brakes wet disc hydraulically power actuated operated by two foot pedals which can be locked Steering mechanical with power assist Turning radius (on concrete surface with brake applied) right 109" left 109" (on concrete surface without brake) right 131" left 131" Turning space diameter (on concrete surface with brake applied) right 238" left 238" (on concrete surface without brake) right 281" left 281" Belt pulley none Power take-off 540 or 1000 rpm at 1730 or 2225 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, second, and third gears were not run as it was necessary to limit the pull in fourth gear because of the stability formula. Tenth gear was not run because it exceeded 15 mph.

The drawbar used with the three point hitch was bent during the drawbar runs.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 877.

L. F. LARSEN

Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman

J. J. SULEK

D. E. LANE

Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station
E. F. Frolik, Dean; H. H. Kramer, Director, Lincoln, Nebraska

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 trans-

mission, 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.



Ford Commander 6000 Gasoline