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Test 843: Ford 6000 (Diesel)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 843 - FORD 6000 DIESEL

The University of Nebraska Agricultural Experiment Station

E. F. Frolik, Dean; H. H. Kramer, Director, Lincoln, Nebraska

POWER TAKE-OFF PERFORMANCE

Hp	Crankshaft 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								
62.72	2230	4.683	0.515	13.39	182	64	75	28.792
Standard Power Take-off Speed (1000 rpm)—One hour								
51.84	1731	3.724	0.496	13.92	183	65	75	28.840

VARYING POWER AND FUEL CONSUMPTION—TWO HOURS

56.85	2379	4.008	0.487	14.18	178	64	75	.....
0.00	2504	1.261	.....	.....	173	63	73	.....
29.34	2454	2.478	0.583	11.84	178	64	75	.....
62.96	2229	4.646	0.509	13.55	183	64	75	.....
14.87	2491	1.843	0.855	8.07	176	64	74	.....
43.33	2417	3.130	0.498	13.84	178	65	75	.....
Av 34.56	2412	2.894	0.578	11.94	178	64	74	28.820

DRAWBAR PERFORMANCE

Hp	Drawbar pull lbs	Speed miles per hr	Crankshaft speed rpm	Slip of drivers %	Fuel Consumption		Hp-hr per gal	Temp Degrees F			Barometer inches of Mercury
					Gal per hr	Lb per hp-hr		Cooling med	Air wet bulb	Air dry bulb	

VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST

Maximum Available Power—Two Hours—6th Gear											
52.74	4396	4.50	2229	7.67	4.611	0.603	11.44	180	78	92	29.078
75% of Pull at Maximum Power—Ten Hours—6th Gear											
45.03	3423	4.93	2380	5.17	3.624	0.556	12.43	175	73	88	28.907
50% of Pull at Maximum Power—Two Hours—6th Gear											
30.95	2271	5.11	2427	3.60	2.794	0.623	11.08	167	78	95	28.940

MAXIMUM POWER WITH BALLAST

41.95	7225	2.18	2381	14.01	4th Gear	.....	184	73	81	28.945
52.79	5865	3.38	2231	11.00	5th Gear	.....	180	73	90	28.990
54.59	4563	4.49	2235	8.15	6th Gear	.....	185	74	82	29.000
52.75	3779	5.23	2229	6.60	7th Gear	.....	177	74	82	29.000
52.03	2847	6.85	2230	4.85	8th Gear	.....	188	73	90	28.990
50.99	1686	11.34	2238	3.24	9th Gear	.....	178	73	90	28.990

MAXIMUM POWER WITHOUT BALLAST

54.54	4577	4.47	2237	8.51	6th Gear	188	70	85	28.730
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VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—6th Gear

Pounds pull	4563	4718	4832	4857	4834	4770
Horsepower	54.59	50.31	45.45	40.03	34.10	27.85
Crankshaft speed rpm	2235	2001	1767	1554	1326	1099
Miles per hour	4.49	4.00	3.53	3.09	2.65	2.19
Slip of drivers %	8.15	8.66	8.66	9.04	8.79	8.91

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	843 lb each	None
	Cast iron	390 lb each	None
Front tires	—No, size, ply & psi	Two 6.50-16; 6; 28	Two 6.50-16; 6; 32
Ballast	—Liquid	None	None
	Cast iron	None	None
Height of drawbar		21½ inches	22 inches
Static weight	—Rear	7320 lb	4855 lb
	Front	2060 lb	2135 lb
Total weight with operator		9555 lb	7165 lb

Department of Agricultural Engineering

Dates of Test: June 17 to July 2, 1963

Manufacturer: FORD MOTOR COMPANY, BIRMINGHAM, MICHIGAN

Manufacturer's Power Rating: 64.5 PTO Horsepower (corrected to standard conditions)

FUEL, OIL and TIME Fuel No 2 Diesel Cetane No 56.7 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8289 Weight per gallon 6.902 lb Oil SAE 30 API service classification DS To motor 1.221 gal Drained from motor 0.804 gal Transmission and final-drive lubricant Ford hydraulic oil M-2C-41 Total time engine was operated 43 hours.

ENGINE Make Ford Diesel Type 6 cylinder vertical Serial No 18112 Crankshaft mounted lengthwise Rated rpm 2230 Bore and stroke 3.62" x 3.90" Compression ratio 16.5 to 1 Displacement 241.7 cu in Cranking system 12 volt electric Lubrication pressure Air cleaner oil washed wire mesh with centrifugal precleaner Oil filter full flow replaceable paper cartridge Oil cooler heat exchanger in lower radiator tank for transmission oil Fuel filter one edge type filter and one replaceable paper element Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type tricycle Serial No 18112 Tread width rear 56" to 84" front 8.3" to 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 center-line 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 fixed ratio operator controlled full range power shifting Advertised speeds mph first 1.2 second 1.6 third 1.7 fourth 2.3 fifth 3.7 sixth 4.8 seventh 5.5 eighth 7.1 ninth 11.5 tenth 17.0 reverse 3.3 and 4.9 Clutch four multiple disc wet clutches within transmission hydraulically operated Brakes wet disc hydraulically power actuated operated by two foot pedals 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" 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 to avoid excessive wheel slippage. Tenth gear was not run as it exceeded 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 843.

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 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 Model 61106D