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Test 783: Ford 6000 (Diesel)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 783 - FORD 6000 DIESEL

The University of Nebraska Agricultural Experiment Station

E. F. Frolik, Dean; A. W. Epp, Acting Director, Lincoln, Nebraska

POWER TAKE-OFF PERFORMANCE

Hp	Crank shaft speed rpm	Fuel Consumption		Hp-hr per gal	Temp. Degrees F			Barometer inches of mercury	
		Gal per hr	Lb per hp-hr		Cool- ing med	Air wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours									
66.17	2400	5.189	0.542	12.75	204	61	75	28.767	
Standard Power Take-off Speed (1000 rpm)—One Hour									
65.35	2227	5.162	0.546	12.66	188	61	75	28.760	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
58.87	2512	4.247	0.498	13.86	182	60	74	.....
0.00	2592	1.259	....	....	165	59	70	.....
30.14	2572	2.562	0.587	11.76	173	59	72	.....
67.40	2399	5.263	0.539	12.81	194	59	72	.....
15.17	2585	1.854	0.844	8.18	168	57	68	.....
44.86	2551	3.274	0.504	13.70	177	57	68	.....
Av	36.07	2535	3.077	0.589	11.72	176	59	71	28.755

DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank shaft speed rpm	Slip of driv- ers %	Fuel Consumption		Temperature Degrees F			Barometer inches of mercury	
					Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling medium	Air wet bulb		Air dry bulb
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—6th Gear											
59.24	4512	4.92	2399	5.74	5,409	0.631	10.95	179	42	48	28.788
75% of Pull at Maximum Power—Ten Hours—6th Gear											
49.12	3463	5.32	2544	3.90	4,205	0.591	11.68	171	34	41	28.922
50% of Pull at Maximum Power—Two Hours—6th Gear											
33.87	2327	5.46	2581	2.84	3,171	0.647	10.68	170	44	50	28.760
MAXIMUM POWER WITH BALLAST											
44.50	7245	2.30	2542	14.46	4th Gear			171	40	42	28.810
60.74	6167	3.69	2395	8.88	5th Gear			175	40	42	28.810
61.31	4692	4.90	2398	6.04	6th Gear			176	40	42	28.810
59.17	3886	5.71	2397	4.96	7th Gear			176	40	42	28.810
57.58	2913	7.41	2395	4.00	8th Gear			176	40	42	28.810
55.97	1714	12.25	2403	2.08	9th Gear			175	40	42	28.810
MAXIMUM POWER WITHOUT BALLAST											
57.09	4401	4.86	2390	6.53	6th Gear			180	52	62	28.800
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—6th Gear											
Pounds pull			4700	5000	5200	5200	5250	5100			
Horsepower			61.3	58.7	54.1	47.1	40.6	32.6			
Miles per hour			4.9	4.4	3.9	3.4	2.9	2.4			

Department of Agricultural Engineering

Dates of Test: March 25 to April 4, 1961

Manufacturer: FORD MOTOR COMPANY, BIRMINGHAM, MICHIGAN

Manufacturer's Power Rating: 66.0 PTO Horsepower and 60.0 Drawbar Horsepower at 29.00 inches of mercury and 75°F.

FUEL, OIL and TIME Fuel No 2 Diesel Cetane No 54 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8297 Weight per gallon 6.908 lb Oil SAE 30 API service classification DS to motor 1.211 gal Drained from motor 0.894 gal Transmission and final-drive lubricant Ford hydraulic oil M-2C-41 Total time engine was operated 62½ hours.

ENGINE Make Ford Diesel Type 6 cylinder vertical Serial No 134824 Crankshaft mounted lengthwise Rated rpm 2400 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 Oil filter full flow replaceable paper element 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 134824 Tread width rear 56" to 90" front 8.3" to 16.3" Wheel base 95" 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 28.5" Vertical distance above roadway 35.5" Horizontal distance from center of rear wheel tread 0.0 to the right/left Hydraulic control system direct engine drive with accumulator Transmission operator controlled full range power shifting fixed ratio Advertised speeds mph first 1.2 second 1.6 third 1.7 fourth 2.5 fifth 3.9 sixth 5.2 seventh 5.9 eighth 7.6 ninth 12.1 tenth 18.2 reverse 3.5 and 5.2 Clutch 4 multiple disc wet clutches hydraulically operated Brakes wet disc hydraulically power actuated operated by two foot pedals Steering power assisted 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 and 1000 rpm at 1730 or 2225 engine rpm.

REPAIRS AND ADJUSTMENTS During the PTO runs the engine speed became unstable. The governor was replaced and the test continued.

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 783.

L. F. LARSEN

Engineer-in-Charge

L. W. HURLBUT
G. W. STEINBRUEGGE
J. J. SULEK
Board of Tractor
Test Engineers

TIRES, BALLAST and WEIGHT

Rear tires —No, size, ply & psi
Ballast —Liquid
—Cast iron
Front tires —No, size, ply & psi
Ballast —Liquid
—Cast iron

Height of drawbar

Static weight —Rear
—Front

Total weight with operator

With Ballast

Two 15.5-38;6;18
743 lb each
350 lb each
Two 6.50-16;6;28
None
None
21½ inches
7320 lb
2050 lb
9545 lb

Without Ballast

Two 15.5-38;6;16
None
None
Two 6.50-16;6;28
None
None
21½ inches
5135 lb
2095 lb
7405 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.



Ford 6000 Diesel