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Test 881: Ford 3000 8-Speed (Diesel)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 881 - FORD 3000 8-SPEED DIESEL

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								
* 39.20	2000	2.421	0.427	16.19	192	54	74	29.090
Standard Power Take-off Speed (540 rpm)—One Hour								
37.34	1810	2.230	0.412	16.74	191	55	75	29.075

VARYING POWER AND FUEL CONSUMPTION—TWO HOURS

34.80	2089	2.176	0.432	15.99	189	57	78	.....
0.00	2222	0.764	.....	.....	180	56	76	.....
17.86	2145	1.442	0.558	12.39	186	56	76	.....
39.63	2000	2.467	0.430	16.06	193	56	77	.....
9.09	2182	1.086	0.825	8.37	180	56	76	.....
26.36	2110	1.816	0.476	14.52	186	56	76	.....
Av 21.29	2124	1.625	0.527	13.10	185	56	76	29.010

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft 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—4th Gear											
34.88	2798	4.68	1996	4.78	2.538	0.503	13.74	192	42	49	29.250
75% of Pull at Maximum Power—Ten Hours—4th Gear											
29.10	2173	5.02	2125	3.89	2.197	0.521	13.25	189	34	38	29.330
50% of Pull at Maximum Power—Two Hours—4th Gear											
20.34	1473	5.18	2160	2.55	1.814	0.616	11.21	187	36	40	29.050

MAXIMUM POWER WITH BALLAST

27.40	5106	2.01	2111	11.69	2nd Gear	.....	180	31	34	29.340
34.27	3827	3.36	2007	7.30	3rd Gear	.....	192	32	34	29.320
35.71	2876	4.66	2002	5.46	4th Gear	.....	192	32	34	29.320
36.11	2910	4.65	2000	5.35	5th Gear	.....	190	32	32	29.330
35.21	1767	7.47	2009	3.31	6th Gear	.....	189	32	32	29.330
32.24	951	12.71	2007	1.53	7th Gear	.....	185	32	32	29.310

MAXIMUM POWER WITHOUT BALLAST

34.30	2886	4.46	1998	10.58	4th Gear	192	44	47	28.730
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VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—4th Gear

Pounds pull	2876	3087	3277	3288	3287	3336	3247
Horsepower	35.71	34.19	32.20	28.31	24.16	20.45	16.11
Crankshaft Speed, rpm	2002	1792	1595	1399	1195	998	806
Miles per hour	4.66	4.15	3.69	3.23	2.76	2.30	1.86
Slip of drivers, %	5.46	5.89	6.10	6.21	6.21	6.31	6.21

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 14.9-24; 4; 14	Two 14.9-24; 4; 12
	—Liquid	623 lb each	None
	—Cast iron	770 lb each	None
Front tires	—No, size, ply & psi	Two 6.00-16; 4; 28	Two 6.00-16; 4; 24
	—Liquid	None	None
	—Cast iron	None	None
Height of drawbar		19 inches	20½ inches
Static weight	—Rear	5090 lb	2304 lb
	—Front	1620 lb	1662 lb
Total weight with operator		6885 lb	4141 lb

Department of Agricultural Engineering

Dates of Test: MARCH 29 TO APRIL 6, 1965

Manufacturer: FORD MOTOR COMPANY, BIRMINGHAM, MICHIGAN

FUEL, OIL and TIME Fuel No 2 diesel Cetane No 57.0 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8295 Weight per gallon 6.907 lb Oil SAE 10W API service classification DS To motor 1.682 gal Drained from motor 1.344 gal Transmission and final-drive lubricant Ford M2C77A Total time engine was operated 53 hours.

ENGINE Make Ford Diesel Type 3 cylinder vertical Serial No ND002932L4 Crankshaft mounted lengthwise Rated rpm 2000 Bore and stroke 4.2" x 4.2" Compression ratio 16.5 to 1 Displacement 175 cu in Cranking system 12 volt electric Lubrication pressure Air cleaner oil washed wire mesh Oil filter full flow replaceable cotton element Fuel filter one filter with replaceable nylon gauze element and one filter with replaceable paper element Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No C100621 Tread width rear 52" to 76" front 52" to 80" Wheel base 75.8" 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 32.8" Vertical distance above roadway 25.2" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system direct engine drive Transmission selective gear fixed ratio Advertised speeds mph first 1.4 second 2.2 third 3.6 fourth 4.8 fifth 4.8 sixth 7.6 seventh 12.8 eighth 17.4 reverse 2.2 and 8.0 Clutch single plate dry disc in combination with PTO clutch operated by single foot pedal Brakes internal expanding shoe operated by two foot pedals that can be locked Steering mechanical with hydraulic power assist Turning radius (on concrete surface with brake applied) right 117" left 117" (on concrete surface without brake) right 129" left 129" Turning space diameter (on concrete surface with brake applied) right 240" left 240" (on concrete surface without brake) right 267" left 267" Belt pulley 1113 rpm at 2000 engine rpm diam 10.25" face 6.5" Belt sped 2986 fpm Power take-off 537 rpm at 1800 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 was not run as it was necessary to limit the pull in second gear because of the stability formula. Eighth 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 881.

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 3000 8-Speed Diesel