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Test 889: Ford 3000 4-Speed (Gasoline)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 889 - FORD 3000 4-SPEED 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								
* 39.17	2100	3.273	0.508	11.97	196	56	75	29.110
Standard Power Take-off Speed (540 rpm)—One Hour								
30.64	1485	2.510	0.498	12.21	196	56	75	29.100
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
34.53	2177	2.959	0.521	11.67	193	57	76	.....
0.00	2327	1.213	.....	.....	184	56	75	.....
17.79	2243	2.121	0.725	8.39	190	57	76	.....
39.78	2100	3.354	0.513	11.86	198	56	75	.....
9.03	2278	1.667	1.123	5.42	187	57	75	.....
26.19	2203	2.500	0.581	10.48	191	57	76	.....
Av 21.22	2221	2.302	0.660	9.22	190	56	75	29.107

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Fuel Consumption			Temp Degrees F				Barom- eter inches of Mercury
				Slip of drivers %	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 (2nd direct)											
33.04	2538	4.88	2100	5.43	3.270	0.602	10.10	194	64	87	28.890
75% of Pull at Maximum Power—Ten Hours—5th Gear (2nd direct)											
27.40	1987	5.17	2189	3.88	2.799	0.621	9.79	189	59	80	28.688
50% of Pull at Maximum Power—Two Hours—5th Gear (2nd direct)											
19.04	1340	5.33	2220	2.48	2.285	0.730	8.33	191	62	89	28.818
MAXIMUM POWER WITH BALLAST											
30.98	4622	2.51	2180	13.76	1st Gear (1st under)		185	54	67	28.945	
32.28	3932	3.08	2103	9.76	2nd Gear (2nd under)		190	54	67	28.945	
33.64	3198	3.94	2103	7.39	3rd Gear (1st direct)		190	56	69	28.945	
32.63	2620	4.67	2099	5.86	4th Gear (3rd under)		191	56	69	28.945	
34.30	2648	4.86	2097	5.86	5th Gear (2nd direct)		191	58	74	28.945	
33.18	2053	6.06	2097	4.34	6th Gear (1st over)		190	59	75	28.945	
32.91	1703	7.25	2102	3.67	7th Gear (3rd direct)		192	59	75	28.945	
32.75	1648	7.45	2106	3.56	8th Gear (2nd over)		190	62	82	28.940	
32.31	1194	10.15	2109	2.36	9th Gear (4th under)		190	62	82	28.935	
32.30	1100	11.01	2099	1.78	10th Gear (3rd over)		190	62	82	28.930	
MAXIMUM POWER WITHOUT BALLAST											
32.43	2558	4.75	2096	9.05	5th Gear (2nd direct)		192	60	79	28.520	

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—5th Gear (2nd direct)

Pounds pull	2648	2732	2763	2801	2881	2762
Horsepower	34.30	31.62	28.32	25.12	22.23	17.67
Crankshaft speed, rpm	2097	1879	1667	1461	1258	1040
Miles per hour	4.86	4.34	3.84	3.36	2.89	2.40
Slip of drivers, %	5.86	6.18	6.18	6.29	6.40	6.18

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 14.9-24; 4; 12	Two 14.9-24; 4; 12
Ballast	—Liquid	650 lb each	None
	—Cast iron	560 lb each	None
Front tires	—No, size, ply & psi	Two 6.00-16; 4; 28	Two 6.00-16; 4; 28
Ballast	—Liquid	None	None
	—Cast iron	None	None
Height of drawbar		21 inches	22 inches
Static weight	—Rear	4610 lb	2190 lb
	—Front	1620 lb	1600 lb
Total weight with operator		6405 lb	3965 lb

Department of Agricultural Engineering

Dates of Test: APRIL 20 TO MAY 6, 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 1.486 gal Drained from motor 1.454 gal Transmission and final-drive lubricant SAE 80 EP Total time engine was operated 49½ hours.

ENGINE Make Ford gasoline Type 3 cylinder vertical Serial No NG003164M4 Crankshaft mounted lengthwise Rated rpm 2100 Bore and stroke 4.2" x 3.8" Compression ratio 8 to 1 Displacement 157.95 cu in Carburetor size 1¼" Ignition system battery Cranking system 12 volt electric Lubrication pressure Air cleaner dry type with replaceable pleated paper element Oil filter replaceable cotton blend element Fuel filter edge type in sediment bowl Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No 100811 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 center-line 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 4.2 second 5.0 third 7.4 fourth 15.5 reverse 4.4 Clutch single plate dry disc operated by foot pedal Brakes internal expanding shoe operated by two foot pedals which can be locked Steering mechanical with 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 1323 rpm at 1950 engine rpm diam 9" face 6.5" Belt speed 3117 fpm Power take-off 546 rpm at 1500 engine rpm.

REPAIRS and ADJUSTMENTS The governor was replaced before the beginning of the PTO runs.

REMARKS All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

It was necessary to limit the pull in first gear because of the stability formula. Eleventh and twelfth gears were not run as they exceeded 15 mph.

This tractor was equipped with the standard 4-speed transmission plus an optional auxiliary overdrive-underdrive transmission.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 889.

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 4-Speed Gasoline