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Test 879: Ford 5000 8-Speed (Diesel)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 879 - FORD 5000 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									
*	55.96	2100	3.573	0.441	15.66	197	54	76	29.303
Standard Power Take-off (540)—One Hour									
	53.30	1901	3.249	0.421	16.41	197	54	75	29.270
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
	50.37	2224	3.310	0.454	15.22	192	54	77	.....
	0.00	2285	1.025	.....	.....	169	53	73	.....
	25.54	2255	2.085	0.564	12.25	182	53	74	.....
	56.28	2099	3.618	0.444	15.56	200	55	77	.....
	12.84	2268	1.542	0.829	8.33	175	54	75	.....
	38.20	2249	2.649	0.479	14.42	189	55	78	.....
Av	30.54	2230	2.372	0.536	12.88	184	54	75	29.210

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—4th Gear											
47.65	4106	4.35	2096	6.01	3.620	0.525	13.16	191	53	61	28.800
75% of Pull at Maximum Power—Ten Hours—4th Gear											
38.85	3100	4.70	2226	4.38	3.077	0.547	12.63	176	37	40	29.026
50% of Pull at Maximum Power—Two Hours—4th Gear											
27.87	2153	4.85	2269	3.15	2.506	0.621	11.12	170	41	45	29.015
MAXIMUM POWER WITH BALLAST											
34.02	6991	1.83	2185	14.07	2nd Gear			182	55	65	28.840
45.84	5533	3.11	2102	8.98	3rd Gear			191	55	65	28.840
48.07	4134	4.36	2103	6.01	4th Gear			195	55	61	28.840
49.33	4244	4.36	2107	6.39	5th Gear			195	55	65	28.805
48.83	2622	6.98	2100	3.77	6th Gear			190	55	65	28.805
43.86	1391	11.83	2087	2.17	7th Gear			193	55	65	28.805
MAXIMUM POWER WITHOUT BALLAST											
46.60	4101	4.26	2100	9.21	4th Gear			198	54	61	28.700
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—4th Gear											
Pounds pull				4134	4273	4509	4580	4620	4537		
Horsepower				48.07	46.72	43.93	39.14	34.15	28.61		
Crankshaft speed, rpm				2103	1983	1774	1559	1349	1149		
Miles per hour				4.36	4.10	3.65	3.20	2.77	2.36		
Slip of drivers, %				6.01	6.32	6.82	6.82	7.06	7.06		

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 16.9-30; 6; 16	Two 16.9-30; 6; 16
Ballast	—Liquid	860 lb each	None
	Cast iron	888 lb each	None
Front tires	—No, size, ply & psi	Two 7.50-16; 4; 24	Two 7.50-16; 4; 24
Ballast	—Liquid	65 lb each	None
	Cast iron	None	None
Height of drawbar		22 inches	23½ inches
Static weight	—Rear	7090 lb	3600 lb
	Front	2220 lb	2090 lb
Total weight with operator		9485 lb	5865 lb

Department of Agricultural Engineering

Dates of Test: MARCH 16 TO APRIL 9, 1965

Manufacturer: FORD MOTOR COMPANY,
BIRMINGHAM, MICHIGAN

FUEL, OIL and TIME Fuel No 2 Diesel
Cetane No 57.0 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 1.226 gal Trans-
mission lubricant Ford Oil ESNM2C77-A Final
Drive Lubricant Ford Oil ESNM2C53-A Total
time engine was operated 44 hours.

ENGINE Make Ford Diesel Type 4 cylinder
vertical Serial No RD002356L4 Crankshaft
mounted lengthwise Rated rpm 2100 Bore and
stroke 4.2" x 4.2" Compression ratio 16.5 to 1
Displacement 233 cu in Cranking system 12 volt
electric Lubrication pressure Air cleaner oil
washed wire mesh with centrifugal precleaner
Oil filter full flow replaceable paper 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 C100735
Tread width rear 52" to 80" front 52" to 80"
Wheel base 87.5" Center of gravity (without
operator or ballast, with minimum tread, with
fuel tank filled and tractor serviced for opera-
tion) Horizontal distance forward from center
line of rear wheels 27.30" Vertical distance above
roadway 32.95" Horizontal distance from center
of rear wheel tread .02" to the right Hydraulic
control system direct engine drive Transmission
selective gear fixed ratio Advertised speeds mph
first 1.3 second 2.1 third 3.5 fourth 4.7 fifth 4.7
sixth 7.4 seventh 12.4 eighth 16.8 reverse 2.1 and
7.7 Clutch single plate dry disc operated by foot
pedal Brakes wet double disc operated by two
foot pedals that can be locked Steering mechan-
ical with hydraulic power assist Turning radius
(on concrete surface with brake applied) right
111" left 111" (on concrete surface without
brake) right 141" left 141" Turning space diam-
eter (on concrete surface with brake applied)
right 249" left 249" (on concrete surface without
brake) right 294" left 294" Belt pulley 1072 rpm
at 2050 engine rpm diam 11" face 6.5" Power
take-off 540 rpm at 1900 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 be-
cause it exceeded 15 mph.

A transmission oil leak developed near the
gear shift lever during the drawbar runs.

We, the undersigned, certify that this is a true
and correct report of official Tractor Test 879.

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 5000 8-Speed Diesel