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Test 1000: Ford 5000 Diesel Select-O-Speed (Also Ford 5000 Diesel Select-O-Speed Row Crop)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1000 – FORD 5000 DIESEL SELECT-O-SPEED (ALSO FORD 5000 DIESEL SELECT-O-SPEED ROW CROP)

POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	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		
*	MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours									
66.49	2100	4.482	0.465	14.83	215	58	75	29.111	
Standard Power Take-off Speed (540 rpm)—One Hour									
63.94	1902	4.155	0.448	15.39	218	58	75	29.123	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
59.06	2196	3.802	0.444	15.53	200	57	74	.....
0.00	2326	1.079	.....	.....	175	57	74	.....
30.55	2271	2.349	0.530	13.01	184	57	75	.....
66.68	2101	4.529	0.468	14.72	213	57	75	.....
15.50	2301	1.653	0.735	9.38	179	57	75	.....
45.15	2236	3.054	0.466	14.78	190	58	75	.....
Av	36.16	2238	2.744	0.523	13.18	190	57	75	29.140

DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Slip of drivers %	Fuel Consumption			Temp Degrees F			Barom- eter inches of Mercury
					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—6th Gear											
56.53	5179	4.09	2094	9.86	4.530	0.553	12.48	180	35	36	28.633
75% of Pull at Maximum Power—Ten Hours—6th Gear											
48.02	3955	4.55	2235	6.09	3.564	0.512	13.47	176	30	32	29.151
50% of Pull at Maximum Power—Two Hours—6th Gear											
33.47	2667	4.71	2262	4.08	2.821	0.581	11.86	176	33	34	29.143
MAXIMUM POWER WITH BALLAST											
39.47	7200	2.06	2240	13.12	4th Gear		170	32	37	28.710	
57.06	6872	3.11	2099	12.04	5th Gear		175	33	36	28.710	
58.14	5194	4.20	2102	7.99	6th Gear		180	32	35	28.715	
57.75	4435	4.88	2103	6.97	7th Gear		179	33	35	28.705	
57.21	3372	6.36	2094	5.42	8th Gear		178	33	36	28.700	
54.82	1952	10.53	2093	3.16	9th Gear		175	33	37	28.700	
MAXIMUM PULL WITHOUT BALLAST											
43.18	4980	3.25	2233	14.90	5th Gear		182	39	45	28.700	
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—6th Gear											
Pounds pull				5194	5483	5648	5664	5623	5525		
Horsepower				58.14	54.65	50.13	43.72	37.20	30.50		
Crankshaft speed rpm				2102	1884	1682	1464	1254	1046		
Miles per hour				4.20	3.74	3.33	2.89	2.48	2.07		
Slip of drivers, %				7.99	8.53	8.76	9.00	8.88	8.76		

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
	—Liquid	777 lb each	None
	Cast iron	1008 lb each	None
Front tires	—No, size, ply & psi	Two 7.50-16; 4; 24	Two 7.50-16; 4; 24
	—Liquid	66 lb each	None
	Cast iron	74 lb each	None
Height of drawbar		22½ inches	23½ inches
Static weight with operator—	Rear	7350 lb	3780 lb
	Front	2350 lb	2070 lb
	Total	9700 lb	5850 lb

Department of Agricultural Engineering

Date of Test: October 30 to December 2, 1968

Manufacturer: FORD MOTOR COMPANY,
FORD TRACTOR OPERATIONS, BIR-
MINGHAM, MICHIGAN

FUEL, OIL and TIME Fuel No. 2 Diesel
Cetane No 54.3 (rating taken from oil company's
typical inspection data) Specific gravity con-
verted to 60°/60° 0.8283 Weight per gallon
6.896 Oil SAE 30 API service classification
MS DS To motor 1.634 Drained from motor
1.367 gal Transmission lubricant Ford oil
ESN-M2C41-A or M-2C41 Final-drive lubricant
Ford oil ESN-M2C53-A or M-2C53-B Total
time engine was operated 46½ hours,
vertical Serial No E004142 Crankshaft mounted
lengthwise Rated rpm 2100 Bore and stroke
4.4" x 4.2" Compression ratio 16.5 to 1 Dis-
placement 256 cu in Cranking system 12 volt
electric Lubrication pressure Air cleaner oil
washed wire mesh Oil filter full flow replace-
able cotton blend Oil cooler engine coolant
heat exchanger in lower radiator tank for trans-
mission oil Fuel filter one nylon gauze element
in bottom of tank and dual replaceable paper
elements with water traps Muffler was used
Cooling medium temperature control thermo-
stat.

CHASSIS Type standard Serial No C209904
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 0" to the right/left Hydraul-
ic control system direct engine drive Transmis-
sion selective gear fixed ratio with operator
controlled full range power shifting Advertised
speeds mph first 1.0 second 1.5 third 1.7 fourth
2.3 fifth 3.6 sixth 4.6 seventh 5.3 eighth 6.9
ninth 11.1 tenth 16.4 reverse 3.1 and 4.6 Clutch
oil cooled multiple disc clutches within trans-
mission hydraulically operated Brakes oil cooled
multiple disc mechanically 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 141"
left 141" Turning space diameter (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" Belt speed 3087 fpm
Power take-off 540 rpm at 1901 engine rpm.

REPAIRS AND ADJUSTMENTS: During
preliminary pto runs, all injectors were removed
and checked. Injector No. 3 was disassembled,
brushed, reinstalled 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 pull in fourth gear because of the stability
formula. Tenth gear was not run because it
exceeded 15 mph.

We, the undersigned, certify that this is a true
and correct report of official Tractor Test 1000.

L. F. LARSEN

Engineer-In-Charge

G. W. STEINBRUEGGE, Chairman

W. E. SPLINTER

D. E. LANE

Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station
E. F. Frolik, Dean; H. W. Ottoson, 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, $\frac{1}{2}$ of 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 transmission, 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 Pull without Ballast. All added ballast is removed from the tractor. The drawbar pull is determined at slip limits of 15% for pneumatic tires or 7% for steel tracks or lugs. The tractor is operated at the fastest possible travel speed.

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 DIESEL SELECT-O-SPEED