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Test 685: Fordson Power Major (Diesel)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 685 - FORDSON POWER MAJOR DIESEL

The University of Nebraska Agricultural Experiment Station

W. V. Lambert, Director; Lincoln, Nebraska

BELT POWER 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								
47.65	1700	3.182	0.468	14.97	151	54	75	28.827
Standard Power Take-off Speed (540 rpm)—One Hour								
45.39	1601	3.026	0.467	15.00	156	54	75	28.825
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
43.00	1801	2.714	0.442	15.84	137	53	75	.....
2.43	1947	0.856	2.469	2.84	120	52	72	.....
22.26	1857	1.618	0.509	13.76	123	53	75	.....
47.89	1700	3.214	0.470	14.90	155	54	77	.....
11.51	1919	1.194	0.727	9.64	123	54	77	.....
32.85	1830	2.123	0.453	15.47	119	54	78	.....
Av 26.66	1842	1.953	0.514	13.65	129	53	75	28.772

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank shaft speed rpm	% Slip of drive wheels	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—3rd Gear											
42.63	4341	3.68	1700	6.44	3.212	0.528	13.27	125	38	43	29.025
75% of Pull at Maximum Power—Ten Hours—3rd Gear											
34.84	3289	3.97	1804	4.88	2.453	0.493	14.20	117	35	36	28.871
50% of Pull at Maximum Power—Two Hours—3rd Gear											
23.86	2203	4.06	1809	2.92	1.861	0.547	12.82	114	36	37	29.055
MAXIMUM POWER WITH BALLAST											
40.24	8038	1.88	1693	13.98	1st Gear	.....	122	38	42	29.055	
42.05	5699	2.77	1696	10.04	2nd Gear	.....	123	38	43	28.830	
42.59	4403	3.63	1700	7.79	3rd Gear	.....	122	32	35	28.910	
43.59	3123	5.23	1696	5.26	4th Gear	.....	122	32	35	28.910	
42.42	2136	7.45	1702	3.72	5th Gear	.....	128	32	38	28.900	
35.51	969	13.74	1712	1.75	6th Gear	.....	125	39	45	28.790	
MAXIMUM POWER WITHOUT BALLAST											
41.37	4323	3.59	1700	11.26	3rd Gear	.....	132	48	58	28.550	
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—3rd Gear											
Pounds pull		4400	4550	4700	4700	4700	4700	4700	4550		
Horsepower		42.6	40.0	36.3	31.3	26.3			21.8		
Miles per hour		3.6	3.3	2.9	2.5	2.1			1.8		

TIRES, BALLAST and WEIGHT

	With Ballast	Without Ballast
Rear tires	—No, size, ply & psi Two 14-30;6;16	Two 14-30;6;16
Ballast	—Liquid 538 lb each	None
	—Cast iron 1400 lb each	None
Front tires	—No, size, ply & psi Two 7.50-16;6;36	Two 7.50-16;6;36
Ballast	—Liquid 75 lb each	None
	—Cast iron 450 lb each	None
Height of drawbar	20½ inches	22 inches
Static weight	—Rear 7275 lb	3400 lb
	—Front 2920 lb	1870 lb
Total weight with operator	10,370 lb	5445 lb

Department of Agricultural Engineering
 Dates of Test: February 27 to March 16, 1959
 Manufacturer: FORD MOTOR COMPANY LTD.,
 DAGENHAM, ESSEX, ENGLAND
 Manufacturer's Power Rating: Not Rated

FUEL, OIL and TIME Fuel No 2 Diesel Cetane No 51 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8418 Weight per gallon 7.009 lb Oil SAE 20-20W API service classification DG and MS To motor 1.687 gal Drained from motor 1.449 gal Transmission and final-drive lubricant SAE No 20W-30 Type MP Total time motor was operated 48 hours.

ENGINE Make Ford Motor Company Ltd Diesel Type 4 cylinder vertical Serial No 1484654 Crankshaft mounted lengthwise Rated rpm 1700 Lubrication pressure Bore and stroke 3.937" x 4.524" Compression ratio 16 to 1 Displacement 220 cu in Cranking system 12 volts (2-6 volt batteries) Air cleaner oil washed wire gauze Muffler was used Oil filter replaceable treated paper element Fuel filter one replaceable paper element and one edge type filter Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No 1484654 Tread width rear 58" or 62" front 54.0" to 78.0" Wheel base 80" 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 30.3" Vertical distance above roadway 34.5" Horizontal distance from center of rear wheel tread 0" to the right or left Hydraulic control system driven by PTO shaft Advertised speeds mph first 1.91 second 2.83 third 3.76 fourth 5.4 fifth 7.62 sixth 13.84 reverse 2.74 and 5.12 Belt pulley diam 8½" face 6¼" rpm 946 ad 1700 Belt speed 2105 and 3783 fpm Belt type flat length 57" width 5" thickness 0.210" Maximum slip 1.05% Clutch double plate dry disc operated by foot pedal Brakes internal expanding shoe operated by two foot pedals Power take-off 540 rpm at 1600 engine rpm Steering power assisted Turning radius (on concrete surface with brake applied) right 145" left 145" (on concrete surface without brake) right 168" left 168" Turning space diameter (on concrete surface with brake applied) right 302" left 302" (on concrete surface without brake) right 350" left 350".

REPAIRS AND ADJUSTMENTS No repairs or adjustments.

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

We, the undersigned, certify that this is a true and correct report of official Tractor Test No 685.

L. F. LARSEN
 Engineer-in-Charge

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

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common useage. 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 manufacturers published recommendations. The manufacturers 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 manufacturers 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 pully 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 useage.

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

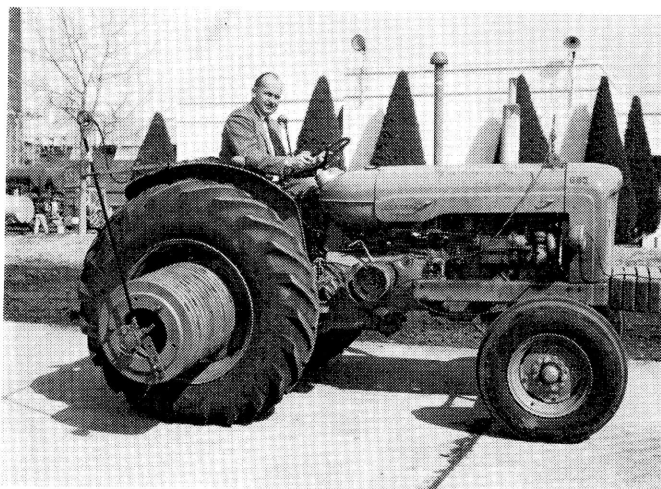
turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum 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.



Fordson Power Major Diesel