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## Test 784: Ford 6000 (Gasoline)

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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# NEBRASKA TRACTOR TEST 784 - FORD 6000 GASOLINE

The University of Nebraska Agricultural Experiment Station

E. F. Frolik, Dean; A. W. Epp, Acting Director, Lincoln, Nebraska

## POWER TAKE-OFF PERFORMANCE

| Hp  | Crank<br>shaft<br>speed<br>rpm | Fuel Consumption |                    | Hp-hr<br>per<br>gal | Temp. Degrees F     |                    |                    | Barometer<br>inches of<br>mercury |        |
|---|--------------------------------|------------------|--------------------|---------------------|---------------------|--------------------|--------------------|-----------------------------------|--------|
|   |                                | Gal<br>per<br>hr | Lb<br>per<br>hp-hr |                     | Cool-<br>ing<br>med | Air<br>wet<br>bulb | Air<br>dry<br>bulb |                                   |        |
| MAXIMUM POWER AND FUEL CONSUMPTION                |                                |                  |                    |                     |                     |                    |                    |                                   |        |
| Rated Engine Speed—Two Hours                      |                                |                  |                    |                     |                     |                    |                    |                                   |        |
| 66.86   | 2400                           | 6.478            | 0.589              | 10.32               | 191                 | 57                 | 75                 | 28.782                            |        |
| Standard Power Take-off Speed (1000 rpm)—One Hour |                                |                  |                    |                     |                     |                    |                    |                                   |        |
| 63.12   | 2227                           | 6.087            | 0.586              | 10.37               | 184                 | 57                 | 75                 | 28.750                            |        |
| VARYING POWER AND FUEL CONSUMPTION—TWO HOURS      |                                |                  |                    |                     |                     |                    |                    |                                   |        |
| 59.52   | 2515                           | 6.499            | 0.664              | 9.16                | 185                 | 57                 | 75                 | .....                             |        |
| 0.00  | 2685                           | 2.339            | .....              | .....               | 156                 | 56                 | 73                 | .....                             |        |
| 30.88   | 2609                           | 4.274            | 0.841              | 7.23                | 167                 | 57                 | 74                 | .....                             |        |
| 66.48   | 2401                           | 6.504            | 0.595              | 10.22               | 187                 | 57                 | 75                 | .....                             |        |
| 15.81   | 2668                           | 3.282            | 1.262              | 4.82                | 162                 | 56                 | 73                 | .....                             |        |
| 45.84   | 2579                           | 5.424            | 0.719              | 8.45                | 178                 | 57                 | 75                 | .....                             |        |
| Av  | 36.42                          | 2576             | 4.720              | 0.788               | 7.72                | 172                | 57                 | 74                                | 28.740 |

## DRAWBAR PERFORMANCE

| Hp  | Draw-bar<br>pull<br>lbs | Speed<br>miles<br>per<br>hr | Crank<br>shaft<br>speed<br>rpm | Slip<br>of<br>driv-<br>ers<br>% | Fuel Consumption |                 |         | Temperature Degrees F |                    |                    | Barometer<br>inches of<br>mercury |
|---|-------------------------|-----------------------------|--------------------------------|---------------------------------|------------------|-----------------|---------|-----------------------|--------------------|--------------------|-----------------------------------|
|   |                         |                             |                                |                                 | Gal<br>per hr    | Lb per<br>hp-hr | per gal | Cooling<br>medium     | Air<br>wet<br>bulb | Air<br>dry<br>bulb |                                   |
| VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST     |                         |                             |                                |                                 |                  |                 |         |                       |                    |                    |                                   |
| Maximum Available Power—Two Hours—6th Gear                  |                         |                             |                                |                                 |                  |                 |         |                       |                    |                    |                                   |
| 59.34   | 4473                    | 4.98                        | 2400                           | 5.21                            | 6.534            | 0.669           | 9.08    | 161                   | 36                 | 40                 | 29.110                            |
| 75% of Pull at Maximum Power—Ten Hours—6th Gear             |                         |                             |                                |                                 |                  |                 |         |                       |                    |                    |                                   |
| 49.45   | 3470                    | 5.34                        | 2544                           | 3.92                            | 6.454            | 0.793           | 7.66    | 161                   | 39                 | 47                 | 29.126                            |
| 50% of Pull at Maximum Power—Two Hours—6th Gear             |                         |                             |                                |                                 |                  |                 |         |                       |                    |                    |                                   |
| 33.85   | 2286                    | 5.55                        | 2610                           | 2.73                            | 4.850            | 0.871           | 6.98    | 157                   | 30                 | 33                 | 29.068                            |
| MAXIMUM POWER WITH BALLAST                                  |                         |                             |                                |                                 |                  |                 |         |                       |                    |                    |                                   |
| 45.05   | 7235                    | 2.34                        | 2561                           | 14.37                           | 4th Gear         | .....           | 160     | 51                    | 58                 |                    | 28.590                            |
| 60.68   | 6030                    | 3.77                        | 2403                           | 7.66                            | 5th Gear         | .....           | 156     | 35                    | 39                 |                    | 28.930                            |
| 61.09   | 4625                    | 4.95                        | 2397                           | 5.48                            | 6th Gear         | .....           | 158     | 34                    | 39                 |                    | 28.930                            |
| 59.44   | 3864                    | 5.77                        | 2404                           | 4.73                            | 7th Gear         | .....           | 159     | 34                    | 39                 |                    | 28.930                            |
| 58.08   | 2915                    | 7.47                        | 2398                           | 3.96                            | 8th Gear         | .....           | 157     | 36                    | 42                 |                    | 28.920                            |
| 56.70   | 1727                    | 12.31                       | 2405                           | 2.91                            | 9th Gear         | .....           | 159     | 36                    | 42                 |                    | 28.920                            |
| MAXIMUM POWER WITHOUT BALLAST                               |                         |                             |                                |                                 |                  |                 |         |                       |                    |                    |                                   |
| 59.46   | 4553                    | 4.90                        | 2399                           | 6.51                            | 6th Gear         | .....           | 161     | 37                    | 44                 |                    | 29.125                            |
| VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—6th Gear |                         |                             |                                |                                 |                  |                 |         |                       |                    |                    |                                   |
| Pounds pull   |                         | 4650                        |                                | 4750                            |                  | 4900            |         | 4950                  |                    | 4900               | 4950                              |
| Horsepower  |                         | 61.1                        |                                | 57.0                            |                  | 52.3            |         | 46.2                  |                    | 39.2               | 33.0                              |
| Miles per hour  |                         | 5.0                         |                                | 4.5                             |                  | 4.0             |         | 3.5                   |                    | 3.0                | 2.5                               |

Department of Agricultural Engineering

Dates of Test: April 1 to April 8, 1961

Manufacturer: FORD MOTOR COMPANY, BIRMINGHAM, MICHIGAN

Manufacturer's Power Rating: 66.0 PTO Horsepower and 60.0 Drawbar Horsepower at 29.00 inches of mercury and 75°F.

**FUEL, OIL and TIME** Fuel regular gasoline Octane No Motor 85 Research 92 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7302 Weight per gallon 6.079 lb Oil SAE 20-20W API service classification MS, DG To motor 1.499 gal Drained from motor 0.789 gal Transmission and final-drive lubricant Ford hydraulic oil M-2C-41 Total time engine was operated 55 hours.

**ENGINE** Make Ford gasoline Type 6 cylinder vertical Serial No 135549 Crankshaft mounted lengthwise Rated rpm 2400 Bore and stroke 3.62" x 3.60" Compression ratio 8.4 to 1 Displacement 223 cu in Carburetor size 1 1/4" Ignition system battery Cranking system 12 volt electric Lubrication pressure Air cleaner oil washed wire mesh Oil filter full flow replaceable paper element Oil cooler heat exchanger in lower radiator tank for transmission oil Muffler was used Cooling medium temperature control thermostat.

**CHASSIS** Type tricycle Serial no 135549 Tread width rear 56" to 90" front 8.3" to 16.3" Wheel base 95" 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 28.0" Vertical distance above roadway 35.5" Horizontal distance from center of rear wheel tread 0.0" to the right/left Hydraulic control system direct engine drive with accumulator Transmission operator controlled full range power shifting fixed ratio Advertised speeds mph first 1.2 second 1.6 third 1.7 fourth 2.5 fifth 3.9 sixth 5.2 seventh 5.9 eighth 7.6 ninth 12.1 tenth 18.2 reverse 3.5 and 5.2 Clutch 4 multiple disc wet clutches hydraulically operated Brakes wet disc hydraulically power actuated operated by two foot pedals Steering power assisted Turning radius (on concrete surface with brake applied) right 109" left 109" (on concrete surface without brake) right 131" left 131" Turning space diameter (on concrete surface with brake applied) right 238" left 238" (on concrete surface without brake) right 281" left 281" Power take-off 540 and 1000 rpm at 1730 or 2225 engine rpm.

**REPAIRS AND ADJUSTMENTS** It was necessary to readjust the high idle speed during the drawbar runs.

**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 the pull in fourth gear to avoid excessive wheel slippage. Tenth 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 784.

L. F. LARSEN

Engineer-in-Charge

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

## TIRES, BALLAST and WEIGHT

Rear tires —No, size, ply & psi  
Ballast —Liquid  
—Cast iron  
Front tires —No, size, ply & psi  
Ballast —Liquid  
—Cast iron  
Height of drawbar  
Static weight —Rear  
—Front  
Total weight with operator

With Ballast  
Two 15.5-38;6;18  
780 lb each  
350 lb each  
Two 6.50-16;6;28  
None  
25 lb each  
21 inches  
7320 lb  
2040 lb  
9535 lb

Without Ballast  
Two 15.5-38;6;16  
None  
None  
Two 6.50-16;6;28  
None  
None  
21 1/2 inches  
5060 lb  
1990 lb  
7225 lb



# 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 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.**



Ford 6000 Gasoline