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Nebraska Tractor Tests

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1-1-1955

## Test 562: Ford Model 860

Nebraska Tractor Test Lab

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

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The Experiment Station  
University of Nebraska College of Agriculture  
W. V. Lambert, Director, Lincoln, Nebraska

Department of Agricultural Engineering  
Dates of test: September 21 to October 6, 1955  
Manufacturer: FORD MOTOR COMPANY, BIRMINGHAM, MICHIGAN  
Manufacturer's rating: Not rated

NEBRASKA TRACTOR TEST NO. 562

FORD 860

**BELT HORSEPOWER TESTS**

Hp	Crank shaft speed rpm	Fuel Consumption			Water used gal per hour	Temp Deg F		Barometer inches of mercury		
		Gal per hour	Hp-hr per gal	Lb per hp-hour		Cooling med	Air			
TEST B—100% MAXIMUM LOAD—TWO HOURS										
45.41	2200	4.055	11.20	0.547	0.00	173	59	28.950		
TEST C—OPERATING MAXIMUM LOAD—ONE HOUR										
43.04	2200	3.642	11.82	0.518	0.00	171	56	28.960		
TEST D—RATED LOAD—ONE HOUR										
39.97	2202	3.466	11.53	0.531	0.00	169	56	28.970		
TEST E—VARYING LOAD—TWO HOURS (20 minute runs; last line average)										
40.13	2202	3.463	11.59	0.529	...	166	55	.....		
1.77	2360	1.381	1.28	4.780	...	140	55	.....		
21.23	2326	2.439	8.70	0.704	...	153	55	.....		
40.27	2029	3.404	11.83	0.518	...	166	56	.....		
10.80	2350	1.866	5.79	1.058	...	147	56	.....		
31.17	2287	3.007	10.37	0.591	...	164	57	.....		
24.23	2259	2.593	9.34	0.656	0.00	156	56	28.980		
TORQUE (At Dynamometer)										
Eng. rpm	2197	2060	1926	1798	1672	1540	1412	1284	1144	992
Lb-ft	275.3	281.8	286.0	289.8	294.0	297.5	299.3	307.1	315.0	306.3
Dyn rpm	815	786	714	666	620	570	524	476	424	367

**DRAWBAR HORSEPOWER TESTS**

Hp	Draw bar pull lb	Speed miles per hr	Crank shaft speed rpm	Slip of drive wheels %	Fuel Consumption			Water used gal per hour	Temp Deg F		Barometer inches of mercury
					Gal per hour	Hp-hr per gal	Lb per hp-hr		Cool- ing med	Air	
TEST H—RATED LOAD—TEN HOURS—3rd Gear											
30.51	2559	4.47	2002	6.76	2.968	10.28	0.596	0.00	170	67	28.988
TEST F—100% MAXIMUM LOAD											
39.00	3330	4.39	2003	8.60	3rd gear .....				183	65	29.180
TEST G—OPERATING MAXIMUM LOAD											
22.72	4514	1.89	2000	16.98	1st gear (part throttle) .....				168	67	29.165
35.26	4139	3.19	2000	11.54	2nd gear .....				172	64	29.180
36.51	3085	4.44	2004	7.70	3rd gear .....				172	67	29.180
35.47	2128	6.25	1999	5.62	4th gear .....				172	65	29.170
32.69	1069	11.47	2004	2.85	5th gear .....				172	65	29.160
TEST J—OPERATING MAXIMUM LOAD											
26.18	2312	4.25	2006	13.78	3rd gear (part throttle) .....				170	68	28.760
TEST K—OPERATING MAXIMUM LOAD											
20.00	1966	3.81	2009	16.93	3rd gear (part throttle) .....				166	70	28.760

**TIRES, WHEELS AND WEIGHT**

	Tests F, G, & H	Test J	Test K
<b>Rear wheels</b>			
Type	Pressed steel	Pressed steel	Pressed steel
Liquid ballast	421 lb each	None	None
Added cast iron	925 lb each	None	None
<b>Rear tires</b>			
No. and size	Two 12-28	Two 12-28	Two 10-28
Ply	4	4	4
Air pressure	14 lb	12 lb	12 lb
<b>Front wheels</b>			
Type	Pressed steel	Pressed steel	Pressed steel
Liquid ballast	79 lb each	None	None
Added cast iron	105 lb each	None	None
<b>Front tires</b>			
No. and size	Two 6.00-16	Two 6.00-16	Two 6.00-16
Ply	4	4	4
Air pressure	28 lb	28 lb	28 lb
<b>Height of drawbar</b>	23 inches	24½ inches	21½ inches
<b>Static weight</b>			
Rear end	4582 lb	1890 lb	1845 lb
Front end	1558 lb	1190 lb	1189 lb
<b>Total weight as tested with operator</b>	6315 lb	3255 lb	3209 lb

**FUEL, OIL and TIME** Gasoline Octane No. ASTM 80.1 Research 85.7 (rating taken from oil company's typical inspection data) Weight per gallon 6.125 lb OIL SAE 20 to motor 1.252 gal Drained from motor 1.208 gal Total time motor was operated 40 hours.

**CHASSIS** Type Standard Serial No. 33812 Tread width rear 52" to 76" front 52" to 80" Wheel base 74.5" Hydraulic control system direct engine drive Advertised speeds mph first 2.22 second 3.52 third 4.72 fourth 6.48 fifth 11.75 reverse 3.80 Belt pulley diam 9" Face 6½" rpm 1279 Belt speed 3015 fpm Clutch dual dry disc clutch operated by single foot pedal Seat pressed steel cushioned by rubber in torsion Brakes internal expanding shoes operated by two foot pedals located on right hand side of tractor Equalized by foot action only Power take-off constant running controlled by secondary clutch.

**ENGINE** Make Ford Type 4 cylinder vertical Serial No. 33812 Crankshaft mounted lengthwise Head I Lubrication pressure Bore and stroke 3.90" x 3.60" Rated rpm belt 2200 drawbar 2000 Compression ratio 6.75 to 1 Displacement 172 cu in Port diameter valves inlet 1.46" exhaust 1.26" Governor variable speed centrifugal fly ball Carburetor size 1" Ignition system battery Starting system 6 volt battery Air cleaner oil washed wire mesh Muffler was used Oil filter full flow with replaceable paper element Cooling medium temperature control thermostat.

**REPAIRS AND ADJUSTMENTS** No repairs or adjustments.

**REMARKS** All test results were determined from observed data and without allowances, additions or deductions. Tests B and F were made with carburetor set for 100% maximum belt horsepower and data from these tests were used in determining the horsepower to be developed in tests D and H, respectively. Tests C, D, E, G, H, J, and K were made with an operating setting of the carburetor (selected by the manufacturer) of 94.5% of maximum belt horsepower.

**HORSEPOWER SUMMARY**

	Drawbar	Belt
1. Sea level (calculated) maximum horsepower (based on 60° F. and 29.92" Hg)	40.18	46.89
2. Observed maximum horsepower (tests F and B)	39.00	45.41
3. Seventy-five per cent of calculated maximum drawbar horsepower and eighty-five per cent of calculated maximum belt horsepower (formerly ASAE and SAE ratings)	30.14	39.86

We, the undersigned, certify that this is a true and correct report of official tractor test No. 562.

L. F. LARSEN  
Engineer-In-Charge

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

## EXPLANATION OF TEST REPORT

**TEST A:** The manufacturer's representative operates the tractor for a minimum of 12 hours using light to heavy drawbar loads in each gear.

This serves as a period for limber up, general observation and adjustments. Adjustments that are permissible include valve tappet clearance, breaker point gap, spark plug gaps, clutch and others of a similar nature. No new parts or accessories can be installed without having mention made of it in the report.

No data are recorded during this preliminary run except the time that the engine is operated.

### BELT HORSEPOWER TESTS

**TEST B:** The throttle valve is held wide open and the belt load on the dynamometer is adjusted so that the engine is at the rated speed recommended by the manufacturer. Carburetor, ignition timing and manifold adjustments are all set for maximum engine power.

This test is designed to determine maximum belt horsepower of the tractor at rated speed and to measure fuel consumption at the maximum power on the belt.

**TEST C:** For tractors with carburetors the best fuel economy does not always occur when the engine develops maximum power at rated speed. Test C is intended to allow the manufacturer's representative to select a more economical fuel setting even though there is a slight loss of power. *This more practical carburetor setting is used in all later tests except test F.* The throttle valve is held wide open and load adjusted to give rated rpm. Tests B and C are the same for diesel tractors, which have an altogether different fuel system.

**TEST D:** The throttle control lever is set so that the governor will maintain rated engine speed when rated load is applied. Rated load is 85% of 100% maximum, as obtained in test B, corrected to standard conditions.

This rating is somewhat less than the maximum belt horsepower in order that the operator may have a certain amount of reserve.

### TEST E:

Varying load serves to show the range of engine speeds when the engine is controlled by the governor during the following varied loads, of 20 minutes each: rated load, no load,  $\frac{1}{2}$  rated load, maximum load at wide open throttle valve,  $\frac{1}{4}$  and  $\frac{3}{4}$  rated load.

The average result of this test shows the average power and fuel consumption. Since the average tractor is subjected to varying loads, these data serve well in predicting fuel consumption and efficiency of a tractor in general use.

Torque, lb-ft at dynamometer, is obtained with wide open throttle and sufficient load is applied to give several readings.

### DRAWBAR HORSEPOWER TESTS

In all drawbar tests the pull exerted by the tractor is transmitted by a hydraulic pressure cylinder to a recording instrument in the test car. All tests are made on the same dirt test course which is maintained by grading, sprinkling and rolling

so that it remains very nearly the same throughout the season. The same tires, wheels and weights are used for all tests except J and K.

**TEST F:** A drawbar test, the results of which are used to determine the rated drawbar horsepower in test H. The carburetor is set to develop maximum power as in test B. The rated gear recommended by manufacturer as plow gear is used in this test. The drawbar load is adjusted to give rated engine speed.

**TEST G:** Maximum drawbar horsepower is determined in each gear when the carburetor is set for fuel economy as in test C. The throttle valve is held wide open and the load is applied so that the engine runs at rated engine speed.

When operating in low gear it is not uncommon for the tractor to develop less drawbar horsepower than in rated gear because of excessive wheel slippage. When excessive wheel slippage occurs the load is reduced until slippage approaches 16%. When the load is reduced it is necessary to operate the tractor engine at part throttle and control engine speed by governor action.

**TEST H:** Intended to test the ability of the tractor to run continuously for 10 hours at rated drawbar horsepower and to determine the fuel consumption during that time. Rated drawbar horsepower is 75% of 100% maximum drawbar horsepower (Test F), corrected to standard conditions.

When operating at rated load the throttle control lever is set to maintain rated engine speed. This rating is less than maximum drawbar horsepower in order that the operator may have a certain amount of reserve.

**TEST J:** The tractor is operated in rated gear with all added weight removed. This test shows the effect of the removal of added weight on the performance of the tractor when compared with test G.

Removal of wheel weights generally increases wheel slippage and decreases drawbar horsepower.

**TEST K:** Similar to test J except that the smallest tires and lightest wheels offered by the manufacturer are used.

