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## Test 857: Farmall 806 (Diesel)

Nebraska Tractor Test Lab

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

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# NEBRASKA TRACTOR TEST 857 - FARMALL 806 DIESEL

The University of Nebraska Agricultural Experiment Station

E. F. Frolik, Dean; H. H. Kramer, Director, Lincoln, Nebraska

## 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									
94.93	2400	6.344	0.462	14.96	199	65	75	28.700	
Standard Power Take-off Speed (1000 rpm)—One Hour									
89.04	2067	5.876	0.456	15.15	207	65	75	28.700	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
82.01	2439	5.452	0.459	15.04	189	65	75	.....	
0.00	2619	1.959	.....	.....	155	65	74	.....	
42.81	2547	3.658	0.590	11.70	165	65	75	.....	
94.49	2400	6.308	0.461	14.98	194	65	75	.....	
21.67	2579	2.776	0.885	7.81	158	65	74	.....	
62.66	2485	4.487	0.495	13.96	173	65	73	.....	
Av	50.61	2511	4.107	0.560	12.32	172	65	74	28.697

## DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Slip of drivers %	Fuel Consumption			Temp Degrees F			Barometer 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—10th Gear (2nd Hi-TA)											
84.77	5708	5.57	2395	7.60	6.397	0.521	13.25	183	55	57	29.300
75% of Pull at Maximum Power—Ten Hours—10th Gear (2nd Hi-TA)											
67.26	4345	5.80	2448	5.68	5.124	0.526	13.13	167	46	50	29.130
50% of Pull at Maximum Power—Two Hours—10th Gear (2nd Hi-TA)											
44.82	2746	6.12	2529	3.76	4.032	0.621	11.12	144	41	53	29.345
MAXIMUM POWER WITH BALLAST											
63.80	9182	2.61	2454	14.96	5th Gear (3rd Lo-TA)			176	67	74	28.735
81.91	8722	3.52	2407	12.30	6th Gear (4th Lo-TA)			182	50	57	29.290
82.09	7836	3.93	2402	10.68	7th Gear (3rd Lo-DD)			187	51	57	29.275
84.33	7804	4.05	2400	10.68	8th Gear (1st Hi-TA)			190	51	57	29.275
84.23	5848	5.40	2396	7.87	9th Gear (4th Lo-DD)			188	51	57	29.275
86.30	5824	5.56	2395	7.81	10th Gear (2nd Hi-TA)			189	51	57	29.275
86.36	5235	6.19	2397	6.79	11th Gear (1st Hi-DD)			182	51	57	29.275
86.09	3844	8.40	2402	5.03	12th Gear (2nd Hi-DD)			184	51	57	29.275
86.66	3240	10.03	2404	4.38	13th Gear (3rd Hi-TA)			186	48	54	29.270
84.19	2331	13.54	2405	3.13	14th Gear (4th Hi-TA)			181	48	54	29.270
82.46	2068	14.95	2405	2.61	15th Gear (3rd Hi-DD)			175	48	54	29.270
MAXIMUM POWER WITHOUT BALLAST											
82.24	5653	5.46	2398	10.20	10th Gear (2nd Hi-TA)			185	58	64	28.750
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 10th Gear (2nd Hi-TA)											
Pounds pull			5824	6277	6397	6698	7006	7111	6990		
Horsepower			86.30	83.43	74.96	68.38	60.93	51.46	40.25		
Crankshaft speed rpm			2395	2158	1909	1669	1431	1192	949		
Miles per hour			5.56	4.98	4.39	3.83	3.26	2.71	2.16		
Slip of drivers %			7.81	8.08	8.48	8.87	9.40	9.53	9.40		

## TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 18.4-34; 8; 16	Two 18.4-34; 8; 16
Ballast	—Liquid	1288 lb each	None
	Cast iron	None	None
Front tires	—No, size, ply & psi	Two 7.50L-15; 8; 36	Two 7.50L-15; 8; 36
Ballast	—Liquid	None	None
	Cast iron	None	None
Height of drawbar		20 1/2 inches	22 inches
Static weight	—Rear	8910 lb	6335 lb
	Front	2810 lb	2780 lb
Total weight with operator		11895 lb	9290 lb

## Department of Agricultural Engineering

Dates of Test: October 22 to October 30, 1963

Manufacturer: INTERNATIONAL HARVESTER COMPANY, CHICAGO, ILLINOIS

Manufacturer's Power Rating: Not rated

**FUEL, OIL and TIME** Fuel No 2 Diesel Cetane No 57.2 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8294 Weight per gallon 6.906 lb Oil SAE 30 API service classification MS, DS To motor 2.392 gal Drained from motor 1.902 gal Transmission and final-drive lubricant IH Hy-Tran fluid Total time engine was operated 57 hours.

**ENGINE** Make International Diesel Type 6 cylinder vertical Serial No D3612034 Crankshaft mounted lengthwise Rated rpm 2400 Bore and stroke 4 1/8" x 4 1/2" Compression ratio 17.0 to 1 Displacement 361 cu in Cranking system 12 volt electric (two 6-volt batteries) Lubrication pressure Air cleaner two stage dry type with automatic dust unloader using replaceable pleated paper element Oil filter full flow replaceable treated paper element Oil cooler engine coolant heat exchanger for crankcase oil and radiator for transmission and hydraulic oil Fuel filter one primary and one final fuel filter using replaceable treated paper elements Muffler was used Cooling medium temperature control thermostat.

**CHASSIS** Type Tricycle Serial No 635 SY Tread width rear 56" to 94" front 8" or 16" Wheel base 101.2" Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from centerline of rear wheels 31.5" Vertical distance above roadway 35.4" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system direct engine drive Transmission selective gear fixed ratio with partial range operator controlled power shifting Advertised speeds mph first 1.26 second 1.67 third 1.84 fourth 2.45 fifth 2.90 sixth 3.87 seventh 4.26 eighth 4.39 ninth 5.68 tenth 5.84 eleventh 6.44 twelfth 8.56 thirteenth 10.14 fourteenth 13.53 fifteenth 14.87 sixteenth 19.84 Reverse first 2.16 second 2.87 third 3.17 fourth 4.21 fifth 4.98 sixth 6.65 seventh 7.31 eighth 9.75 Clutch single plate dry disc operated by foot pedal Brakes dry disc hydraulically power actuated operated by two foot pedals Steering hydraulic with power assist Turning radius (on concrete surface with brake applied) right 113" left 113" (on concrete surface without brake) right 123" left 119" Turning space diameter (on concrete surface with brake applied) right 241" left 241" (on concrete surface without brake) right 260" left 254" Belt pulley 1067 rpm at 2100 engine rpm diam 11" face 7.5" Belt speed 3073 fpm Power take-off 539 or 1014 rpm at 2100 engine rpm.

**REPAIRS and ADJUSTMENTS** The three point hitch horizontal stabilizer failed during the maximum power drawbar runs. This was replaced and test continued.

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

First, second, third, and fourth gears were not run as it was necessary to limit the pull in fifth gear to avoid excessive wheel slippage. Sixteenth 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 857.

L. F. LARSEN

Engineer-in-Charge

L. W. HURLBUT, Chairman

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 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.



Farmall 806 Diesel