

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

1-1-1976

test 1212: White Field Boss 2-70 Diesel (Also White Farm Equipment 2-70 Diesel) 18-Speed

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Energy Systems Commons](#), [History of Science, Technology, and Medicine Commons](#), [Other Mechanical Engineering Commons](#), [Physical Sciences and Mathematics Commons](#), [Science and Mathematics Education Commons](#), and the [United States History Commons](#)

Nebraska Tractor Test Lab, "test 1212: White Field Boss 2-70 Diesel (Also White Farm Equipment 2-70 Diesel) 18-Speed" (1976). *Nebraska Tractor Tests*. 1533.
<https://digitalcommons.unl.edu/tractormuseumlit/1533>

This Article is brought to you for free and open access by the Tractor Test and Power Museum, The Lester F. Larsen at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Tractor Tests by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

NEBRASKA TRACTOR TEST 1212 – WHITE FIELD BOSS 2-70 DIESEL ALSO WHITE FARM EQUIPMENT 2-70 DIESEL 18 SPEED

POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Air wet bulb	Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—994 rpm)								
70.71	2200	4.856	0.479	14.56	187	66	76	28.900
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
64.83	2373	4.433	0.477	14.63	176	67	77	.....
0.00	2433	1.446	.....	.....	146	66	76	.....
32.57	2384	2.720	0.582	11.97	168	67	77	.....
70.17	2200	4.777	0.475	14.69	190	68	79	.....
16.55	2405	2.057	0.867	8.05	156	68	79	.....
48.41	2357	3.503	0.504	13.82	173	69	81	.....
Av 38.75	2359	3.156	0.568	12.28	168	67	78	28.897

DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Slip of drivers %	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cool- ing med	Air wet bulb	Air dry bulb	Barometer inches of Mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours 10th (4-U) Gear											
57.29	4097	5.24	2199	6.21	4.806	0.585	11.92	183	62	68	28.860
75% of Pull at Maximum Power—Ten Hours 10th (4-U) Gear											
48.06	3171	5.68	2343	4.52	3.963	0.575	12.13	179	60	70	29.010
50% of Pull at Maximum Power—Two Hours 10th (4U) Gear											
33.63	2155	5.85	2385	3.41	3.138	0.650	10.72	157	54	59	28.960
50% of Pull at Reduced Engine Speed—Two Hours 13th (4-O) Gear											
33.17	2119	5.87	1654	3.30	2.654	0.558	12.50	169	55	63	28.875
MAXIMUM POWER WITH BALLAST											
47.92	7550	2.38	2328	14.92	2nd (1-D) Gear			172	59	68	28.900
58.58	5308	4.14	2202	8.05	7th (3-D) Gear			176	59	67	28.920
57.93	4298	5.06	2202	6.27	9th (3-O) Gear			174	58	66	28.930
59.10	4223	5.25	2201	6.21	10th (4-U) Gear			183	57	65	28.940
59.47	3486	6.40	2199	5.01	11th (4-D) Gear			181	59	67	28.920
58.81	2743	8.04	2200	3.93	14th (5-D) Gear			180	59	67	28.910
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 10th (4-U) Gear											
Pounds Pull			4223	4475	4628	4680	4649	4666	4477		
Horsepower			59.10	55.93	51.40	45.56	38.62	32.15	24.90		
Crankshaft Speed rpm			2201	1974	1760	1544	1317	1093	880		
Miles Per Hour			5.25	4.69	4.16	3.65	3.12	2.58	2.09		
Slip of Drivers %			6.21	6.49	7.04	6.90	6.76	6.90	6.76		

TRACTOR SOUND LEVEL WITHOUT CAB db(A)

Maximum Available Power 2 Hours	100.5
75% of Pull at Max. Power 10 Hours	99.0
50% of Pull at Max. Power 2 Hours	99.0
50% of Pull at Reduced Engine Speed 2 Hours	97.0
Bystander in 18th (6-O) Gear	90.5

TIRES, BALLAST AND WEIGHT

		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi	Two 18.4-34; 6; 16	Two 18.4-34; 6; 16
Ballast	—Liquid	None	None
	Cast Iron	480 lb each	None
Front Tires	—No., size, ply & psi	Two 11L-15; 6; 32	Two 11L-15; 6; 32
Ballast	—Liquid	None	None
	Cast Iron	20 lb each	None
Height of drawbar		21 inches	21 inches
Static weight with operator—rear		7120 lb	6160 lb
front		2510 lb	2470 lb
total		9630 lb	8630 lb

Department of Agricultural Engineering

Dates of Test: May 18 to 28, 1976

Manufacturer: WHITE FARM EQUIPMENT COMPANY, 2625 Butterfield Road, Oak Brook, Illinois 60521

FUEL, OIL AND TIME: Fuel No. 2 Diesel Cetane No. 51.8 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8372 Weight per gallon 6.971 lb Oil SAE 30 API service classification SB/SE-CA/CD To motor 2.289 gal Drained from motor 1.974 gal Transmission and final drive lubricant SAE 80-90 Total time engine was operated 41.5 hours.

ENGINE: Make White Farm Equipment Diesel Type 6 cylinder vertical Serial No. 286286 Crankshaft mounted lengthwise Rated rpm 2200 Bore and stroke 3.875" x 4.00" Compression ratio 16 to 1 Displacement 283 cu. in. Cranking system 12 volt Lubrication pressure Air cleaner two stage pleated paper element with centrifugal precleaner Oil filter full flow pleated paper spin-on cartridge Oil cooler radiator for hydraulic oil and Hydraul-shift oil Fuel filter snap-on paper cartridge Muffler vertical Cooling medium temperature control thermostat.

CHASSIS: Type standard Serial No. 266304-412 Tread width rear 56.5" to 85.75" front 60" to 84" Wheel base 105.5" 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 28.2" Vertical distance above roadway 32.4" 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 (3) range operator controlled power shift Advertised speeds mph first 2.1 second 2.6 third 3.1 fourth 3.2 fifth 3.6 sixth 3.9 seventh 4.4 eighth 4.6 ninth 5.2 tenth 5.4 eleventh 6.5 twelfth 6.7 thirteenth 7.8 fourteenth 8.1 fifteenth 9.7 sixteenth 11.5 seventeenth 13.8 eighteenth 16.6 reverse 2.5, 3.0, 3.6, 4.2, 5.1, 6.1 Clutch single plate dry disc operated by foot pedal Brakes double dry disc operated by two foot pedals which can be locked together Steering hydrostatic Turning radius (on concrete surface with brake applied) right 146" left 146" (on concrete surface without brake) right 166" left 166" Turning space diameter (on concrete surface with brake applied) right 300" left 300" (on concrete surface without brake) right 340" left 340" Power take-off 550 rpm and 994 rpm at 2200 engine rpm.

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: During final inspection one cylinder wall was found to be slightly scratched. All test results were determined from observed data obtained in accordance with SAE and ASAE test code or official Nebraska test procedure. Temperature at injection pump return was 158°F. Six gears were chosen between 15% slip and 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1212.

LOUIS I. LEVITICUS

Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman

W. E. SPLINTER

D. E. LANE

Board of Tractor Test Engineers

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories may be disconnected only when the means for disconnecting can be reached from the operator station. 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. Prior to the maximum power run the tire tread-bar height must be at least 65% of new tread height.

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 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 use.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effects 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 4 different runs 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; (3) 50% of the pull at maximum power; and (4) maintaining the same load and travel speed as in (3) by shifting to a higher gear and reducing the engine rpm.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 6 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 manufacturer's representative has the option of selecting one gear or speed over eight miles per hour. The maximum safe speed for the Nebraska Test Course has been set at 15 mph. The slip limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Varying Drawbar Pull 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.

SOUND MEASUREMENT

Sound is recorded during each of the Varying Power and Fuel Consumption runs as the tractor travels on a straight section of the test course. The dB(A) sound level is obtained with the microphone located near the right ear of the operator. Bystander sound readings are taken with the microphone placed 25 feet from the line of travel of the tractor.

An increase of 10 dB(A) will approximately double the loudness to the human ear.

For additional information about the Nebraska Tractor Tests write to the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska 68583.



WHITE FIELD BOSS 2-70 DIESEL