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Test 1468: White Farm Equipment 2-110 Diesel 18-Speed

Nebraska Tractor Test Lab
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NEBRASKA TRACTOR TEST 1468 — WHITE FARM EQUIPMENT 2-110 DIESEL 18 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F *(°C)* Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1007 rpm)								
110.52 *(82.41)*	2200	6.589 *(24.942)*	0.418 *(0.254)*	16.77 *(3.304)*	183 *(83.7)*	52 *(11.2)*	75 *(23.8)*	29.023 *(98.007)*
*** VARYING POWER AND FUEL CONSUMPTION—Two Hours**								
95.81 *(71.45)*	2242	5.943 *(22.497)*	0.435 *(0.264)*	16.12 *(3.176)*	179 *(81.7)*	52 *(11.4)*	74 *(23.6)*	....
0.00 *(0.00)*	2374	2.064 *(7.813)*	....	....	173 *(78.3)*	52 *(11.1)*	76 *(24.2)*	....
49.21 *(36.70)*	2304	4.050 *(15.331)*	0.577 *(0.351)*	12.15 *(2.394)*	175 *(79.4)*	52 *(11.1)*	73 *(22.8)*	....
111.86 *(83.41)*	2199	6.636 *(25.120)*	0.416 *(0.253)*	16.86 *(3.320)*	182 *(83.1)*	52 *(11.4)*	76 *(24.2)*	....
24.90 *(18.57)*	2332	3.100 *(11.735)*	0.872 *(0.531)*	8.03 *(1.582)*	174 *(78.9)*	53 *(11.7)*	76 *(24.4)*	....
72.91 *(54.37)*	2276	4.945 *(18.719)*	0.475 *(0.289)*	14.74 *(2.905)*	176 *(80.0)*	52 *(11.4)*	74 *(23.6)*	....
Av 59.11 ***(44.08)***	**2288**	**4.456** ***(16.868)***	**0.528** ***(0.321)***	**13.27** ***(2.613)***	**176** ***(80.2)***	**52** ***(11.3)***	**75** ***(23.8)***	**29.007** ***(97.951)***

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F *(°C)* Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 11th (4D) Gear											
93.66 *(69.84)*	5494 *(24.44)*	6.39 *(10.29)*	2199	5.76	6.601 *(24.986)*	0.494 *(0.300)*	14.19 *(2.795)*	183 *(83.9)*	53 *(11.7)*	63 *(17.2)*	28.500 *(96.240)*
75% of Pull at Maximum Power—Ten Hours 11th (4D) Gear											
74.24 *(55.36)*	4144 *(18.43)*	6.72 *(10.81)*	2270	4.08	5.676 *(21.488)*	0.536 *(0.326)*	13.08 *(2.577)*	180 *(81.9)*	44 *(6.8)*	49 *(9.2)*	28.860 *(97.456)*
50% of Pull at Maximum Power—Two Hours 11th (4D) Gear											
50.86 *(37.93)*	2763 *(12.29)*	6.90 *(11.11)*	2305	3.00	4.692 *(17.760)*	0.646 *(0.393)*	10.84 *(2.136)*	177 *(80.6)*	35 *(1.4)*	36 *(2.2)*	29.065 *(98.148)*
50% of Pull at Reduced Engine Speed—Two Hours 15th (5O) Gear											
50.98 *(38.01)*	2764 *(12.29)*	6.92 *(11.13)*	1402	2.84	3.675 *(13.911)*	0.505 *(0.307)*	13.87 *(2.733)*	179 *(81.4)*	38 *(3.1)*	39 *(3.9)*	29.045 *(98.081)*
MAXIMUM POWER IN SELECTED GEARS											
84.15 *(62.75)*	9500 *(42.26)*	3.32 *(5.35)*	2220	14.77	5th (2D) Gear			181 *(82.8)*	49 *(9.4)*	54 *(12.2)*	28.580 *(96.510)*
86.87 *(64.78)*	9138 *(40.65)*	3.57 *(5.74)*	2199	12.73	6th (3U) Gear			181 *(82.8)*	50 *(10.0)*	56 *(13.3)*	28.580 *(96.510)*
90.30 *(67.34)*	8143 *(36.22)*	4.16 *(6.69)*	2200	10.15	7th (2O) Gear			182 *(83.3)*	52 *(11.1)*	61 *(16.1)*	28.530 *(96.342)*
91.81 *(68.46)*	7705 *(34.27)*	4.47 *(7.19)*	2201	9.21	8th (3D) Gear			183 *(83.6)*	52 *(11.1)*	61 *(16.1)*	28.540 *(96.375)*
91.89 *(68.52)*	6607 *(29.39)*	5.22 *(8.39)*	2199	7.42	9th (4U) Gear			182 *(83.3)*	52 *(11.1)*	61 *(16.1)*	28.540 *(96.375)*
90.78 *(67.69)*	6184 *(27.51)*	5.50 *(8.86)*	2200	6.66	10th (3O) Gear			182 *(83.3)*	52 *(11.1)*	60 *(15.6)*	28.550 *(96.409)*
94.90 *(70.77)*	5561 *(24.73)*	6.40 *(10.30)*	2199	5.64	11th (4D) Gear			182 *(83.3)*	51 *(10.6)*	59 *(15.0)*	28.560 *(96.443)*
92.72 *(69.14)*	4727 *(21.02)*	7.36 *(11.84)*	2200	4.85	12th (5U) Gear			182 *(83.3)*	52 *(11.1)*	60 *(15.6)*	28.530 *(96.342)*
92.81 *(69.21)*	4482 *(19.93)*	7.77 *(12.50)*	2199	4.68	13th (4O) Gear			182 *(83.3)*	52 *(11.1)*	60 *(15.6)*	28.520 *(96.308)*
93.97 *(70.08)*	3933 *(17.49)*	8.96 *(14.42)*	2200	3.79	14th (5D) Gear			182 *(83.1)*	52 *(11.1)*	60 *(15.6)*	28.520 *(96.308)*

Department of Agricultural Engineering

Dates of Test: March 17 to April 5, 1983

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

FUEL, OIL AND TIME: FUEL No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° *(15°/15°)*** 0.8416 **Fuel weight** 7.007 lbs/gal *(0.840 kg/l)* **Oil** White Farm Equipment Company Supreme Blend **SAE** 30 **API service classification** CC-CD, SD-SF **To motor** 3.424 gal *(12.961 l)* **Drained from motor** 2.639 gal *(9.990 l)* **Transmission and final drive lubricant** White Farm Equipment Company Universal Fluid **Front axle lubricant** SAE 80-90 multi-purpose gear lubricant **Total time engine was operated** 43.5 hours

ENGINE: Make Perkins Diesel **Type** six cylinder vertical with turbocharger **Serial No.** TU70018U668790J **Crankshaft** lengthwise **Rated rpm** 2000 to 2200 **Bore and stroke** 3.875″ x 5.00″ *(98.4 mm x 127 mm)* **Compression ratio** 15.5 to 1 **Displacement** 354 cu in *(5802 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** two paper cartridges **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and hydraul shift oil **Fuel Filter** two paper elements and water separator **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: Type front wheel assist **Serial No.** 301398-436 **Tread width** rear 62.5″ *(1588 mm)* to 111″ *(2820 mm)* front 66″ *(1680 mm)* to 80″ *(2030 mm)* **Wheel base** 86.3″ *(2192 mm)* **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 33.7″ *(856 mm)* Vertical distance above roadway 43.3″ *(1100 mm)* Horizontal distance from center of rear wheel tread 0″ *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (3) range operator controlled powershift **Advertised speeds mph *(km/h)*** first 1.6 *(2.6)* second 2.0 *(3.2)* third 2.4 *(3.9)* fourth 3.1 *(5.0)* fifth 3.7 *(6.0)* sixth 3.9 *(6.3)* seventh 4.4 *(7.1)* eighth 4.7 *(7.6)* ninth 5.4 *(8.7)* tenth 5.7 *(9.2)* eleventh 6.5 *(10.5)* twelfth 7.4 *(11.9)* thirteenth 7.8 *(12.6)* fourteenth 8.9 *(14.3)* fifteenth 10.7 *(17.2)* sixteenth 13.0 *(20.9)* seventeenth 15.7 *(25.2)* eighteenth 18.8 *(30.3)* reverse 2.0 *(3.2)*, 2.4 *(3.9)*, 2.8 *(4.5)*, 4.7 *(7.6)*, 5.7 *(9.2)*, 6.8 *(10.9)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple dry disc hydraulically power actuated by two foot pedals which can be locked together and mechanically by hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 195″ *(4.95 m)* left 195″ *(4.95 m)* (on concrete surface without brake) right 233″ *(5.92*

LUGGING ABILITY IN 11th (4D) GEAR

Crankshaft Speed rpm	2199	1987	1751	1540	1308	1100
Pull—lbs *(kN)*	5561 *(24.73)*	6260 *(27.85)*	7041 *(31.32)*	7398 *(32.91)*	7533 *(33.51)*	7098 *(31.57)*
Increase in Pull %	0	13	27	33	35	28
Power—Hp *(kW)*	94.90 *(70.77)*	95.54 *(71.25)*	93.47 *(69.70)*	85.78 *(63.96)*	73.97 *(55.16)*	58.99 *(43.99)*
Speed—Mph *(km/h)*	6.40 *(10.30)*	5.72 *(9.21)*	4.98 *(8.01)*	4.35 *(7.00)*	3.68 *(5.93)*	3.12 *(5.02)*
Slip %	5.64	6.66	7.88	8.62	8.77	8.33

TRACTOR SOUND LEVEL WITH CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	78.0	79.0
75% of Pull at Maximum Power—Ten Hours		78.0
50% of Pull at Maximum Power—Two Hours		78.0
50% of Pull at Reduced Engine Speed—Two Hours		77.5
Bystander in 18th (6O) gear		87.5

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F *(°C)* Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 11th (4D) Gear											
95.07 *(70.89)*	5430 *(24.15)*	6.57 *(10.57)*	2199	3.49	6.583 *(24.918)*	0.485 *(0.295)*	14.44 *(2.845)*	183 *(83.9)*	52 *(10.8)*	58 *(14.4)*	28.525 *(96.325)*
MAXIMUM POWER IN SELECTED GEARS											
73.85 *(55.07)*	12944 *(57.58)*	2.14 *(3.44)*	2252	14.83	3rd (1O) Gear			179 *(81.7)*	47 *(8.3)*	52 *(11.1)*	28.580 *(96.510)*
96.08 *(71.65)*	5494 *(24.44)*	6.56 *(10.56)*	2198	3.49	11th (4D) Gear			182 *(83.3)*	51 *(10.6)*	58 *(14.4)*	28.570 *(96.477)*

SUPPLEMENTARY TESTS
POWER AND FUEL CONSUMPTION AT 2000 RPM
POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F *(°C)* Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—915 rpm)								
111.56 *(83.19)*	2000	6.381 *(24.155)*	0.401 *(0.244)*	17.48 *(3.444)*	184 *(84.3)*	52 *(11.2)*	75 *(23.7)*	29.015 *(97.979)*

TIRES, BALLAST AND WEIGHT		Tested Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 20.8-38; 8; 16 *(110)*
Ballast	—Liquid (each)	None
	—Cast Iron (each),	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 16.9-26; 8; 18 *(125)*
Ballast	—Liquid (each)	None
	—Cast Iron (each)	None
Height of Drawbar		18 in *(455 mm)*
Static Weight with Operator—Rear		8430 lb *(3824 kg)*
	—Front	5525 lb *(2506 kg)*
	—Total	13955 lb *(6330 kg)*

m) left 233″ *(5.92 m)* **Turning space diameter** (on concrete surface with brake applied) 406″ *(10.31m)* left 406″ *(10.31 m)* (on concrete surface without brake) right 482″ *(12.24 m)* left 482″ *(12.24 m)* **Power take-off** 1007 rpm at 2200 engine rpm and 540 rpm at 2192 engine rpm.

REPAIRS and ADJSUTMENTS: No repairs or adjustments

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For maximum power tests, the fuel temperature at the injection pump was maintained at 167°F *(75.1°C)*. Ten gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1468.**

LOUIS I. LEVITICUS
Engineer-in-Charge

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White Farm Equipment 2-110 Diesel

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