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4-17-1984

## Test 1511: Massey-Ferguson 3505 Diesel 16-Speed

Nebraska Tractor Test Lab

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

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# NEBRASKA TRACTOR TEST 1511

## MASSEY FERGUSON 3505 DIESEL

### 16 SPEED

#### POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption			Temperature °F (°C)			Barometer inch Hg (kPa)	
		gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cooling medium	Air wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—1148 rpm)									
91.50 (68.24)	2400	6.398 (24.218)	0.490 (0.298)	14.30 (2.818)	185 (85.0)	57 (13.8)	75 (23.8)	28.84 (97.40)	
Standard Power Take-off Speed (1000 rpm)—One Hour									
87.47 (65.22)	2091	5.632 (21.317)	0.451 (0.274)	15.53 (3.060)	185 (85.0)	57 (13.9)	75 (23.9)	28.83 (97.35)	
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
81.29 (60.62)	2509	5.832 (22.076)	0.502 (0.306)	13.94 (2.746)	183 (83.6)	57 (13.9)	75 (23.9)	..... .....	
0.00 (0.00)	2617	2.168 (8.208)	..... .....	..... .....	174 (78.9)	57 (13.6)	74 (23.3)	..... .....	
41.62 (31.04)	2571	3.882 (14.696)	0.653 (0.397)	10.72 (2.112)	177 (80.6)	58 (14.2)	74 (23.3)	..... .....	
92.18 (68.74)	2399	6.436 (24.363)	0.489 (0.297)	14.32 (2.821)	185 (85.0)	58 (14.4)	74 (23.3)	..... .....	
21.03 (15.68)	2596	3.047 (11.533)	1.014 (0.617)	6.90 (1.360)	175 (79.4)	59 (15.0)	76 (24.4)	..... .....	
61.71 (46.02)	2539	4.761 (18.021)	0.540 (0.329)	12.96 (2.554)	179 (81.7)	59 (15.0)	76 (24.4)	..... .....	
Av Av	49.64 (37.02)	2538 (16.483)	4.354 (0.374)	0.614 (0.374)	11.40 (2.246)	179 (81.5)	58 (14.4)	75 (23.8)	28.84 (97.39)

#### DRAWBAR PERFORMANCE (Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption			Temp. °F (°C)			Barom. inch Hg (kPa)
					gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cool- ing med	Air wet bulb	Air dry bulb	
Maximum Available Power—Two Hours 10th (5H) Gear											
73.43 (54.76)	4886 (21.73)	5.64 (9.07)	2400	6.60	6.356 (24.061)	0.606 (0.369)	11.55 (2.276)	188 (86.4)	53 (11.4)	64 (17.5)	28.69 (96.88)
75% of Pull at Maximum Power—Ten Hours 10th (5H) Gear											
59.72 (44.53)	3707 (16.49)	6.04 (9.72)	2519	4.58	5.479 (20.741)	0.642 (0.391)	10.90 (2.147)	186 (85.6)	57 (14.1)	69 (20.5)	28.40 (95.92)
50% of Pull at Maximum Power—Two Hours 10th (5H) Gear											
40.96 (30.55)	2471 (10.99)	6.22 (10.00)	2553	3.19	4.457 (16.870)	0.762 (0.463)	9.19 (1.811)	184 (84.2)	67 (19.2)	76 (24.2)	28.30 (95.55)
50% of Pull at Reduced Engine Speed—Two Hours 13th (7L) Gear											
40.96 (30.54)	2471 (10.99)	6.22 (10.00)	1585	2.97	3.192 (12.085)	0.546 (0.332)	12.83 (2.527)	185 (84.7)	67 (19.4)	80 (26.4)	28.29 (95.51)
MAXIMUM POWER IN SELECTED GEARS											
55.84 (41.64)	8344 (37.11)	2.51 (4.04)	2522	14.82	5th (3L) Gear			184 (84.4)	65 (18.3)	70 (21.1)	28.30 (95.56)
69.39 (51.75)	8109 (36.07)	3.21 (5.16)	2398	14.08	6th (3H) Gear			188 (86.4)	62 (16.7)	69 (20.6)	28.30 (95.56)
71.41 (53.25)	7999 (35.58)	3.35 (5.39)	2397	13.83	7th (4L) Gear			189 (86.9)	64 (17.8)	71 (21.7)	28.30 (95.56)
74.31 (55.41)	6861 (30.52)	4.06 (6.54)	2398	10.11	8th (5L) Gear			186 (85.3)	50 (10.0)	57 (13.9)	28.67 (96.81)
72.19 (53.83)	5647 (25.12)	4.79 (7.71)	2400	7.66	9th (4H) Gear			185 (85.0)	49 (9.4)	56 (13.3)	28.67 (96.81)
74.35 (55.44)	4942 (21.98)	5.64 (9.08)	2399	6.20	10th (5H) Gear			185 (85.0)	49 (9.4)	55 (12.8)	28.66 (96.78)
74.79 (55.77)	4290 (19.08)	6.54 (10.52)	2399	5.45	11th (6L) Gear			185 (85.0)	50 (10.0)	59 (15.0)	28.68 (96.85)
70.48 (52.56)	2970 (13.21)	8.90 (14.32)	2401	3.68	12th (6H) Gear			185 (84.7)	51 (10.6)	60 (15.6)	28.69 (96.88)

Department of Agricultural Engineering

Dates of Test: April 17-27, 1984

Manufacturer: MASSEY FERGUSON S.A. RN  
188 LA Boursidiere-92357 LePlessis, Robinson,  
France

**FUEL, OIL AND TIME:** Fuel No. 2 Diesel  
Cetane No. 46.0 (rating taken from oil company's  
inspection data) Specific gravity converted to 60°/  
60° (15°/15°) 0.8408 Fuel weight 7.001 lbs/gal  
(0.839 kg/l) Oil SAE 20-20W API service class-  
ification SE, CC, CD To motor 3.678 gal (13.923 l)  
Drained from motor 3.098 gal (11.729 l) Trans-  
mission and final drive lubricant Massey Fergu-  
son Permatran III fluid Total time engine was  
operated 46.0 hours.

**ENGINE:** Make Perkins Diesel Type six cyl-  
inder vertical Serial No. TW31040U709563K  
Crankshaft lengthwise Rated rpm 2400 Bore  
and stroke 3.875" × 5" (98.4 mm × 127 mm)  
Compression ratio 16 to 1 Displacement 354 cu  
in (5798 ml) Starting system 12 volt Lubrication  
pressure Air cleaner two paper elements with  
aspirator Oil filter one full flow cartridge Oil  
cooler engine coolant heat exchanger for crank-  
case oil, radiator for hydraulic and transmission  
oil Fuel filter two paper elements Muffler ver-  
tical Cooling medium temperature control two  
thermostats.

**CHASSIS:** Type front wheel assist Serial No.  
Δ3505RWK322213Δ Tread width 63.8" (1620 mm)  
to 96.9" (2460 mm) front 63" (1600 mm) to 81.5"  
(2070 mm) Wheel base 107.3" (2726 mm) Center  
of gravity (without operator or ballast, with min-  
imum tread, with fuel tank filled and tractor serv-  
iced for operation) Horizontal distance forward  
from center-line of rear wheels 38.0" (965 mm)  
Vertical distance above roadway 40.7" (1033 mm)  
Horizontal distance from center of rear wheel tread  
0" (0 mm) to the right/left Hydraulic control sys-  
tem direct engine drive Transmission selective  
gear fixed ratio with partial (2) range operator  
controlled powershift Advertised speeds mph  
(km/h) first 1.3 (2.1) second 1.8 (2.8) third 2.0 (3.2)  
fourth 2.7 (4.4) fifth 2.8 (4.6) sixth 3.8 (6.1) sev-  
enth 3.9 (6.3) eighth 4.6 (7.4) ninth 5.3 (8.5) tenth  
6.1 (9.8) eleventh 7.0 (11.3) twelfth 9.4 (15.1) thir-  
teenth 9.8 (15.8) fourteenth 13.1 (21.1) fifteenth  
13.6 (22.0) sixteenth 18.2 (29.3) reverse 1.4 (2.3),  
1.9 (3.1), 2.2 (3.6), 3.0 (4.8), 3.1 (5.0), 4.1 (6.7), 4.3  
(6.9), 5.0 (8.1), 5.8 (9.3), 6.7 (10.8), 7.7 (12.4), 10.2  
(16.5) Clutch single dry disc hydraulically op-  
erated by foot pedal Brakes single wet disc hy-  
draulically operated by two foot pedals which can  
be locked together Steering hydrostatic Turn-  
ing radius (on concrete surface with brake ap-  
plied) right 194.5" (4.94 m) left 187" (4.75 m) (on

# LUGGING ABILITY IN 10th (5H) GEAR

Crankshaft Speed rpm	2399	2155	1910	1678	1441	1192	951
Pull—lbs (kN)	4942 (21.98)	5333 (23.90)	5603 (25.11)	5966 (26.74)	5973 (26.77)	5996 (26.88)	5570 (24.97)
Increase in Pull %	0	8	13	21	21	21	13
Power—Hp (kW)	74.35 (55.44)	71.57 (53.37)	66.30 (49.44)	61.54 (45.89)	52.96 (39.49)	43.96 (32.78)	32.81 (24.47)
Speed—Mph (km/h)	5.64 (9.08)	5.03 (8.10)	4.44 (7.14)	3.87 (6.23)	3.33 (5.35)	2.75 (4.43)	2.21 (3.55)
Slip %	6.20	7.08	7.51	8.23	8.09	8.23	7.66

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
Maximum Available Power—Two Hours	81.0	80.0
75% of Pull at Maximum Power—Ten Hours		81.5
50% of Pull at Maximum Power—Two Hours		80.5
50% of Pull at Reduced Engine Speed—Two Hours		77.0
Bystander in 15th (8L) gear		90.5

# DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption			Temp. °F (°C)			Barom. inch Hg (kPa)
					gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cool- ing med	Air wet bulb	Air dry bulb	
Maximum Available Power—Two Hours 10th (5H) Gear											
74.18 (55.32)	4792 (21.31)	5.81 (9.34)	2399	4.59	6.328 (23.953)	0.597 (0.363)	11.72 (2.309)	188 (86.7)	54 (12.2)	68 (19.7)	28.67 (96.81)

# MAXIMUM POWER IN SELECTED GEARS

70.26 (52.39)	10639 (47.32)	2.48 (3.99)	2470	14.85	5th (3L) Gear		188 (86.4)	65 (18.3)	70 (21.1)	28.30 (95.56)
76.84 (57.30)	6792 (30.21)	4.24 (6.83)	2400	7.04	8th (5L) Gear		187 (85.8)	50 (10.0)	58 (14.4)	28.68 (96.85)
75.55 (56.33)	4877 (21.69)	5.81 (9.35)	2400	4.47	10th (5H) Gear		185 (84.7)	48 (8.9)	54 (12.2)	28.66 (96.78)
75.44 (56.25)	4212 (18.73)	6.72 (10.81)	2401	3.92	11th (6L) Gear		185 (85.0)	50 (10.0)	59 (15.0)	28.69 (96.88)

# TIRES, BALLAST AND WEIGHT

Rear Tires		With Ballast		Without Ballast	
Ballast	—No., size, ply & psi (kPa) —Liquid (each) —Test equip. (each)	Two 18.4-38; 8; 18 (125) None 82 lb (37 kg)		Two 18.4-38; 8; 18 (125) None None	
Front Tires		Two 13.6-28; 8; 20 (140)		Two 13.6-28; 8; 20 (140)	
Ballast	—No., size, ply & psi (kPa) —Liquid (each) —Test equip. (each)	None 48 lb (22 kg)		None None	
Height of Drawbar		24 in (610 mm)		24 in (610 mm)	
Static Weight with Operator—Rear		8590 lb (3896 kg)		8425 lb (3821 kg)	
—Front		4605 lb (2089 kg)		4510 lb (2046 kg)	
—Total		13195 lb (5985 kg)		12935 lb (5867 kg)	

concrete surface without brake) right 228" (5.79 m) left 222" (5.64 m) **Turning space diameter** (on concrete surface with brake applied) right 405" (10.28 m) left 391" (9.93 m) (on concrete surface without brake) right 471" (11.96 m) left 459" (11.66 m) **Power take-off** 540 rpm at 1992 engine rpm and 1000 rpm at 2091 engine rpm.

**REPAIRS and ADJUSTMENTS:** No repairs or adjustments.

**REMARKS:** All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 133°F (56.2°C). Eight gears were chosen between 15% slip and 10 mph (16.1 km/h). During inspection, cylinders 2, 3, 4 and 5 were found to have several deep scratches.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1511, June 18, 1984.

LOUIS I. LEVITICUS  
Engineer-in-Charge

K. VON BARGEN  
W. E. SPLINTER  
L. L. BASHFORD

Board of Tractor Test Engineers



Massey Ferguson 3505 Diesel