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## Test 1368: Massey-Ferguson MF220-4 Diesel 12-Speed

Nebraska Tractor Test Lab

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

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# NEBRASKA TRACTOR TEST 1368 — MASSEY-FERGUSON MF220-4 DIESEL

## 12 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—580 rpm)									
26.48 (19.75)	2500	1.929 (7.302)	0.508 (0.309)	13.72 (2.705)	174 (78.9)	59 (14.9)	75 (23.9)	29.183 (98.548)	
Standard Power Take-off Speed (540 rpm)—One Hour									
26.06 (19.43)	2326	1.849 (6.999)	0.495 (0.301)	14.09 (2.776)	173 (78.6)	58 (14.5)	75 (23.9)	29.175 (98.520)	
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
22.87 (17.05)	2541	1.643 (6.219)	0.501 (0.305)	13.92 (2.742)	172 (77.8)	58 (14.4)	75 (23.9)	..... .....	
0.00 (0.00)	2687	0.581 (2.199)	..... .....	..... .....	164 (73.3)	58 (14.4)	75 (23.9)	..... .....	
11.78 (8.78)	2615	1.049 (3.971)	0.622 (0.378)	11.22 (2.211)	169 (76.1)	58 (14.4)	75 (23.9)	.....	
26.76 (19.95)	2500	1.918 (7.260)	0.500 (0.304)	13.95 (2.748)	174 (78.6)	58 (14.4)	76 (24.2)	..... .....	
5.96 (4.44)	2650	0.821 (3.108)	0.962 (0.585)	7.25 (1.429)	166 (74.4)	57 (13.9)	75 (23.9)	..... .....	
17.42 (12.99)	2580	1.320 (4.997)	0.529 (0.322)	13.20 (2.600)	170 (76.7)	57 (13.9)	75 (23.9)	..... .....	
Av Av	14.13 (10.54)	2596	1.222 (4.626)	0.603 (0.367)	11.56 (2.278)	169 (76.2)	58 (14.3)	75 (23.9)	29.160 (98.469)

### 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 9th (H1) Gear											
20.87 (15.56)	2031 (9.03)	3.85 (6.20)	2501	8.10	1.881 (7.122)	0.629 (0.383)	11.09 (2.185)	174 (78.9)	55 (12.8)	72 (22.2)	28.890 (97.557)
75% of Pull at Maximum Power—Ten Hours 9th (H1) Gear											
17.96 (13.39)	1673 (7.44)	4.03 (6.48)	2562	6.25	1.555 (5.888)	0.604 (0.367)	11.55 (2.275)	168 (75.6)	48 (8.9)	60 (15.7)	29.032 (98.037)
50% of Pull at Maximum Power—Two Hours 9th (H1) Gear											
12.57 (9.37)	1123 (5.00)	4.20 (6.75)	2621	4.43	1.254 (4.748)	0.696 (0.423)	10.02 (1.974)	162 (72.2)	39 (3.9)	45 (6.9)	28.985 (97.878)
50% of Pull at Reduced Engine Speed—Two Hours 10th (H2) Gear											
12.55 (9.36)	1119 (4.98)	4.20 (6.77)	1859	4.30	1.021 (3.866)	0.568 (0.345)	12.28 (2.420)	164 (73.3)	46 (7.8)	57 (13.6)	28.865 (97.473)
MAXIMUM POWER IN SELECTED GEARS											
21.78 (16.24)	3496 (15.55)	2.34 (3.76)	2511	14.90	8th (M4) Gear			167 (74.7)	36 (2.2)	40 (4.4)	29.020 (97.996)
22.91 (17.09)	2235 (9.94)	3.84 (6.19)	2499	8.24	9th (H1) Gear			174 (78.6)	55 (12.8)	66 (18.9)	28.820 (97.321)
22.82 (17.02)	1529 (6.80)	5.60 (9.01)	2501	5.30	10th (H2) Gear			173 (78.1)	56 (13.3)	69 (20.6)	28.870 (97.490)
22.18 (16.54)	1121 (4.99)	7.42 (11.94)	2499	3.97	11th (H3) Gear			173 (78.3)	56 (13.3)	69 (20.6)	28.870 (97.490)
LUGGING ABILITY IN 9th (H1) GEAR											
Crankshaft Speed rpm				2499	2254	1998	1738	1496	1244		
Pull—lbs (kN)				2235 (9.94)	2334 (10.38)	2413 (10.73)	2444 (10.87)	2438 (10.84)	2289 (10.18)		
Increase in Pull %				0	4	8	9	9	2		
Power—Hp (kW)				22.91 (17.09)	21.45 (15.99)	19.57 (14.60)	17.22 (12.84)	14.97 (11.03)	11.62 (8.66)		
Speed—Mph (km/h)				3.84 (6.19)	3.45 (5.55)	3.04 (4.90)	2.64 (4.25)	2.28 (3.66)	1.90 (3.06)		
Slip %				8.24	8.86	9.23	9.42	9.32	8.67		

Department of Agricultural Engineering

Dates of Test: September 18 to October 7, 1980

Manufacturer: TOYOSHA COMPANY LTD, 55  
Joshiji-16, Kadoma City, Osaka Japan

**FUEL, OIL AND TIME:** Fuel No. 2 Diesel  
Cetane No. 47.9 (rating taken from oil company's  
inspection data) Specific gravity converted to  
60°/60° (15°/15°) 0.8378 Fuel weight 6.976 lbs/gal  
(0.836 kg/l) Oil SAE 20-20W API service classi-  
fication SB/SE-CA/CC To motor 1.111 gal  
(4.206 l) Drained from motor 0.955 gal (3.614 l)  
Transmission and final drive lubricant Massey  
Ferguson Permatran fluid Total time engine was  
operated 39.0 hours

**ENGINE:** Make Toyosha Diesel Type two  
cylinder vertical Serial No. S 148 MO 1294  
Crankshaft lengthwise Rated rpm 2500 **Bore**  
and stroke 3.82" × 3.94" (97 mm × 100 mm) **Com-**  
pression ratio 23 to 1 Displacement 90.3 cu in  
(1480 ml) Starting system 12 volt Lubrication  
pressure Air cleaner one paper element Oil fil-  
ter one full flow paper cartridge Fuel filter one  
paper cartridge Muffler vertical Cooling  
medium temperature control one thermostat

**CHASSIS:** Type front wheel assist Serial No.  
00624 Tread width rear 40.9" (1040 mm) to 62.5"  
(1588 mm) front 44.9" (1140 mm) Wheel base 62.6"  
(1590 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  
26.0" (660 mm) Vertical distance above roadway  
28.1" (714 mm) Horizontal distance from center of  
rear wheel tread 0" (0 mm) to the right/left **Hyd-**  
raulic control system direct engine drive **Trans-**  
mission selective gear fixed ratio Advertised  
speeds mph (km/h) first 0.3 (0.5) second 0.4 (0.6)  
third 0.6 (1.0) fourth 0.9 (1.4) fifth 1.0 (1.6) sixth  
1.4 (2.3) seventh 1.9 (3.1) eighth 2.8 (4.5) ninth 4.2  
(6.8) tenth 6.0 (9.7) eleventh 7.8 (12.6) twelfth  
11.6 (18.7) reverse 0.6 (1.0), 2.0 (3.2), 8.2 (13.2)  
**Clutch** dry disc operated by foot pedal **Brakes**  
drum and shoe operated by two foot pedals which  
can be locked together **Steering** mechanical  
**Turning radius** (on concrete surface with brake  
applied) right 93.9" (2.38 m) left 94.0" (2.39 m) (on  
concrete surface without brake) right 111.3" (2.83  
m) left 112.6" (2.86 m) **Turning space diameter**  
(on concrete surface with brake applied) right  
203.8" (5.18 m) left 204" (5.18 m) (on concrete sur-  
face without brake) right 237.5" (6.03 m) left  
240.3" (6.10 m) **Power take-off** 540 rpm at 2326  
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 code or official Nebraska test  
procedure. Temperature at injection pump was

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	92.5	92.5
75% of Pull at Maximum Power—Ten Hours		91.5
50% of Pull at Maximum Power—Two Hours		93.0
50% of Pull at Reduced Engine Speed—Two Hours		89.5
Bystander in 12th (H4) gear		79.0

### 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)			
					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	Barom. inch Hg (kPa)
<b>Maximum Available Power—Two Hours 9th (H1) Gear</b>											
21.45 (16.00)	2018 (8.98)	3.99 (6.42)	2500	6.78	1.935 (7.326)	0.629 (0.383)	11.09 (2.184)	175 (79.2)	54 (11.9)	72 (22.2)	28.900 (97.591)

### MAXIMUM POWER IN SELECTED GEARS

17.48 (13.03)	3973 (17.67)	1.65 (2.65)	2577	14.91		7th (M3) Gear	162 (72.2)	35 (1.7)	37 (2.8)	29.040 (98.064)
22.52 (16.79)	2117 (9.42)	3.99 (6.42)	2499	6.68		9th (H1) Gear	173 (78.3)	56 (13.3)	68 (20.0)	28.870 (97.490)

### TIRES, BALLAST AND WEIGHT

		With Ballast	Without Ballast
<b>Rear Tires</b>	—No., size, ply & psi (kPa)	Two 12.4-24; 4; 16 (110)	Two 12.4-24; 4; 16 (110)
Ballast	—Liquid (each)	380 lb (172 kg)	None
	—Cast Iron (each)	224 lb (101 kg)	None
<b>Front Tires</b>	—No., size, ply & psi (kPa)	Two 7-16; 4; 26 (180)	Two 7-16; 4; 26 (180)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	50 lb (23 kg)	None
<b>Height of Drawbar</b>		14 in (355 mm)	14 in (355 mm)
<b>Static Weight with Operator—Rear</b>		3112 lb (1411 kg)	1905 lb (864 kg)
	—Front	1375 lb (624 kg)	1275 lb (578 kg)
	—Total	4487 lb (2035 kg)	3180 lb (1442 kg)

136°F (57.6°C). Four 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 1368.

LOUIS I. LEVITICUS  
Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman  
W. E. SPLINTER  
K. VON BARGEN  
Board of Tractor Test Engineers



Massey-Ferguson MF220-4 Diesel

The Agricultural Experiment Station  
Institute of Agriculture and Natural Resources  
University of Nebraska—Lincoln  
Roy G. Arnold, Director