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

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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 (19.47)	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 <i>Av</i>	14.13 <i>(10.54)</i>	2596 <i>(4.626)</i>	1.222 <i>(0.367)</i>	0.603 <i>(2.278)</i>	11.56 <i>(76.2)</i>	58 <i>(14.3)</i>	75 <i>(23.9)</i>	29.160 <i>(98.469)</i>

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 (9.07)	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 classification 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) Compression ratio 23 to 1 Displacement 90.3 cu in (1480 ml) Starting system 12 volt Lubrication pressure Air cleaner one paper element Oil filter 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 Hydraulic control system direct engine drive Transmission 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 surface 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)			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											
21.45 (16.00)	2018 (8.98)	3.99 (6.42)	2500	6.78	1.935 (7.326)	0.629 (0.385)	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

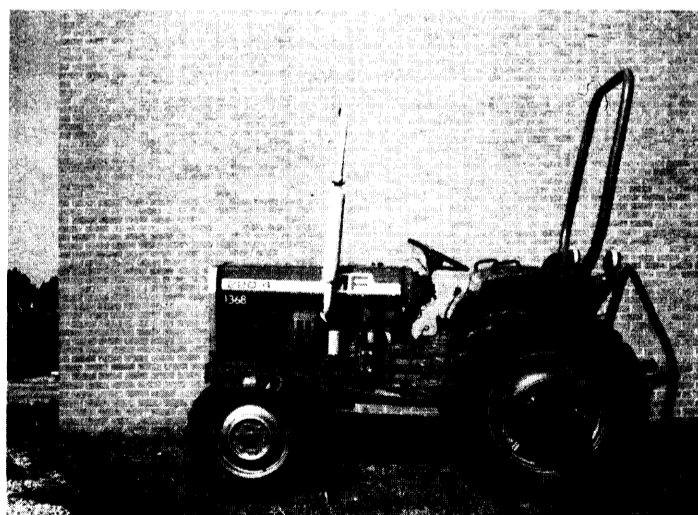
		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 12.4-24; 4; 16 (110)	Two 12.4-24; 4; 16 (110)
Ballast	—Liquid (each)	380 lb (172 kg)	None
	—Cast Iron (each)	224 lb (101 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 7-16; 4; 26 (180)	Two 7-16; 4; 26 (180)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	50 lb (23 kg)	None
Height of Drawbar		14 in (355 mm)	14 in (355 mm)
Static Weight with Operator —Rear		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