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9-11-1984

## Test 1540: Massey-Ferguson 698 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 1540—MASSEY FERGUSON 698 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—640 rpm)								
78.83 (58.79)	2000	5.340 (20.212)	0.472 (0.287)	14.76 (2.908)	184 (84.7)	61 (16.2)	75 (23.9)	29.19 (98.57)
Standard Power Take-off Speed (540 rpm)—One Hour								
74.41 (55.49)	1687	4.677 (17.704)	0.438 (0.267)	15.91 (3.134)	184 (84.4)	62 (16.5)	75 (23.9)	29.22 (98.67)

### VARYING POWER AND FUEL CONSUMPTION—Two Hours

70.34 (52.45)	2100	4.884 (18.487)	0.484 (0.294)	14.40 (2.837)	183 (83.9)	62 (16.7)	75 (23.6)	.....
0.00 (0.00)	2150	1.936 (7.330)	.....	.....	179 (81.7)	61 (16.1)	75 (23.6)	.....
35.40 (26.40)	2113	3.042 (11.516)	0.599 (0.364)	11.64 (2.293)	180 (82.2)	62 (16.4)	75 (23.6)	.....
79.34 (59.17)	2000	5.327 (20.164)	0.468 (0.285)	14.89 (2.934)	185 (85.0)	61 (16.1)	75 (23.9)	.....
17.84 (13.30)	2133	2.423 (9.170)	0.947 (0.576)	7.36 (1.451)	179 (81.7)	61 (16.1)	75 (23.6)	.....
52.86 (39.42)	2106	3.877 (14.675)	0.511 (0.311)	13.63 (2.686)	181 (82.8)	61 (16.1)	76 (24.2)	.....
<b>Av 42.64</b> <b>(31.80)</b>	<b>2100</b>	<b>3.581</b> <b>(13.557)</b>	<b>0.586</b> <b>(0.356)</b>	<b>11.91</b> <b>(2.345)</b>	<b>181</b> <b>(82.9)</b>	<b>61</b> <b>(16.3)</b>	<b>75</b> <b>(23.8)</b>	<b>29.25</b> <b>(98.76)</b>

### 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 7th (1LH) Gear											
66.72 (49.75)	5470 (24.33)	4.57 (7.36)	2000	6.86	5.314 (20.116)	0.555 (0.338)	12.55 (2.473)	185 (85.0)	61 (15.8)	68 (19.7)	29.12 (98.33)
75% of Pull at Maximum Power—Ten Hours 7th (1LH) Gear											
55.20 (41.16)	4219 (18.77)	4.91 (7.90)	2105	5.10	4.511 (17.076)	0.570 (0.347)	12.24 (2.411)	184 (84.6)	59 (14.7)	68 (20.1)	29.12 (98.32)
50% of Pull at Maximum Power—Two Hours 7th (1LH) Gear											
37.98 (28.32)	2814 (12.52)	5.06 (8.15)	2132	3.36	3.586 (13.574)	0.658 (0.400)	10.59 (2.087)	183 (83.9)	51 (10.3)	66 (18.9)	29.28 (98.87)
50% of Pull at Reduced Engine Speed—Two Hours 9th (2LH) Gear											
37.92 (28.28)	2813 (12.51)	5.05 (8.13)	1414	2.96	2.575 (9.746)	0.473 (0.288)	14.73 (2.901)	184 (84.2)	69 (20.3)	86 (30.0)	29.05 (98.08)

### MAXIMUM POWER IN SELECTED GEARS

48.12 (35.88)	8707 (38.73)	2.07 (3.34)	2113	14.73	4th (2HL) Gear		183 (83.9)	55 (12.8)	57 (13.9)	29.11 (98.30)
63.86 (47.62)	8333 (37.07)	2.87 (4.62)	1999	12.88	5th (3LL) Gear		185 (85.0)	56 (13.3)	59 (15.0)	29.12 (98.33)
66.38 (49.50)	6484 (28.84)	3.84 (6.18)	2000	8.93	6th (3HL) Gear		185 (85.0)	50 (10.0)	65 (18.3)	29.35 (99.11)
68.38 (50.99)	5625 (25.02)	4.56 (7.34)	2001	7.23	7th (1LH) Gear		186 (85.3)	51 (10.6)	67 (19.4)	29.31 (98.98)
67.78 (50.55)	4279 (19.03)	5.94 (9.56)	2000	5.17	8th (1HH) Gear		185 (85.0)	51 (10.6)	66 (18.9)	29.34 (99.08)
67.91 (50.64)	3619 (16.10)	7.04 (11.33)	1999	4.54	9th (2LH) Gear		185 (85.0)	50 (10.0)	65 (18.3)	29.35 (99.11)
66.03 (49.24)	2723 (12.11)	9.09 (14.64)	2001	3.32	10th (2HH) Gear		186 (85.3)	51 (10.6)	66 (18.9)	29.34 (99.08)

Department of Agricultural Engineering

Dates of Test: September 11-19, 1984

Manufacturer: MASSEY FERGUSON S.A. Avenue Blaise Pascal, 60026 Beauvais, France

**FUEL, OIL AND TIME:** Fuel No. 2 Diesel Cetane No. 46.8 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F (15/15°C)** 0.8374 **Fuel weight** 6.972 lbs/gal (0.836 kg/l) **Oil** SAE 15W-40 **API service classification** SE, CC, CD **To motor** 2.558 gal (9.684 l) **Drained from motor** 2.195 gal (8.310 l) **Transmission and final drive lubricant** Massey Ferguson Permatran III fluid **Total time engine was operated** 39.5 hours.

**ENGINE:** Make Perkins Diesel **Type** four cylinder vertical **Serial No.** ND31118U527784K **Crankshaft lengthwise** **Rated rpm** 2000 **Bore and stroke** 4.5" × 5.0" (114.4 mm × 127 mm) **Compression ratio** 17.5 to 1 **Displacement** 318 cu in (5212 ml) **Starting system** 12 volt **Lubrication pressure** **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil, radiator for power steering fluid **Fuel filter** two paper elements **Muffler** vertical **Cooling medium temperature control** one thermostat.

**CHASSIS:** **Type** front wheel assist **Serial No.** Δ698RUK250030Δ **Tread width** rear 60" (1524 mm) to 96" (2438 mm) front 66" (1682 mm) to 74" (1886 mm) **Wheel base** 96" (2438 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 36.2" (920 mm) Vertical distance above roadway 41.5" (1054 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 1.2 (2.0) second 1.6 (2.5) third 1.8 (3.0) fourth 2.3 (3.7) fifth 3.4 (5.4) sixth 4.3 (6.9) seventh 5.0 (8.1) eighth 6.4 (10.3) ninth 7.5 (12.1) tenth 9.6 (15.5) eleventh 13.8 (22.2) twelfth 17.6 (28.3) reverse 1.8 (2.9), 2.3 (3.7), 7.5 (12.1), 9.6 (15.5) **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated 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 170.5" (4.33 m) left 173" (4.39 m) (on concrete surface without brake) right 199.5" (5.07 m) left 203" (5.16 m) **Turning space diameter** (on concrete surface with brake applied) right 356" (9.04 m) left 361" (9.17 m) (on concrete surface without brake) right 414" (10.52 m) left 421" (10.69 m) **Power take-off** 540 rpm at 1687 engine rpm and 1000 rpm at 1692 engine rpm **Unladen tractor mass** 9770 lb (4432 kg).

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

### LUGGING ABILITY IN 7th (1LH) GEAR

Crankshaft Speed rpm	2001	1800	1607	1399	1194	994
Pull—lbs (kN)	5625 (25.02)	6077 (27.03)	6436 (28.63)	6672 (29.68)	6868 (30.55)	6769 (30.11)
Increase in Pull %	0	8	14	19	22	20
Power—Hp (kW)	68.38 (50.99)	65.91 (49.15)	61.85 (46.12)	55.46 (41.35)	48.38 (36.08)	39.81 (29.69)
Speed—Mph (km/h)	4.56 (7.34)	4.07 (6.55)	3.60 (5.80)	3.12 (5.02)	2.64 (4.25)	2.21 (3.55)
Slip %	7.23	7.89	8.81	9.32	9.95	9.70

### Front Wheel Drive

TRACTOR SOUND LEVEL WITH CAB	Engaged dB(A)	Disengaged dB(A)
Maximum Available Power—Two Hours	82.5	82.5
75% of Pull at Maximum Power—Ten Hours		81.5
50% of Pull at Maximum Power—Two Hours		81.0
50% of Pull at Reduced Engine Speed—Two Hours		79.5
Bystander in 12th (3HH) 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)
<b>Maximum Available Power—Two Hours 7th (1LH) Gear</b>											
65.83 (49.09)	5214 (23.19)	4.73 (7.62)	2000	5.28	5.300 (20.062)	0.561 (0.341)	12.42 (2.447)	187 (85.8)	66 (18.6)	79 (26.1)	29.09 (98.22)

### MAXIMUM POWER IN SELECTED GEARS

59.34 (44.25)	10758 (47.85)	2.07 (3.33)	2081	14.85	4th (2HL) Gear	184 (84.4)	54 (12.2)	56 (13.3)	29.11 (98.30)
67.89 (50.63)	5400 (24.02)	4.72 (7.59)	2000	5.57	7th (1LH) Gear	186 (85.3)	51 (10.6)	67 (19.4)	29.32 (99.01)

### TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
<b>Rear Tires</b>		
—No., size, ply & psi (kPa)	Two 18.4-34; 6; 16 (110)	Two 18.4-34; 6; 16 (110)
Ballast	1050 lb (476 kg)	None
—Liquid (each)	None	None
—Cast Iron (each)	None	None
<b>Front Tires</b>		
—No., size, ply & psi (kPa)	Two 14.9-24; 6; 20 (140)	Two 14.9-24; 6; 20 (140)
Ballast	None	None
—Liquid (each)	None	None
—Cast Iron (each)	43 lb (19 kg)	None
<b>Height of Drawbar</b>	17 in (430 mm)	17 in (430 mm)
<b>Static Weight with Operator—Rear</b>	8350 lb (3788 kg)	6250 lb (2835 kg)
—Front	3775 lb (1712 kg)	3690 lb (1674 kg)
—Total	12125 lb (5500 kg)	9940 lb (4509 kg)

### THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	3100	21370
Location	trailer tipping connection	
Hydraulic oil temperature °F (°C)	187	86
Location	sump	
	<b>Maximum Lift Capacity</b>	<b>Lift Capacity for Transport</b>
QUICK ATTACH CATEGORY	no II	*not measured
LOAD lbs (kg)	4428	2009
TIME sec	6.61	
<b>HITCH POINT MOVEMENT in (mm)</b>		
Lowest position	13.1	333
Top of timed range	37.1	943
Highest position	38.3	972
<b>LOAD CG MOVEMENT in (mm)</b>		
Lowest position	12.1	306
Top of timed range	39.4	1002
Highest position	41.1	1045

\*Implement load capacity for transport purposes not specified by manufacturer.

**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 137°F (58.1°C). Seven 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 No. 1540, December 3, 1984.

LOUIS I. LEVITICUS

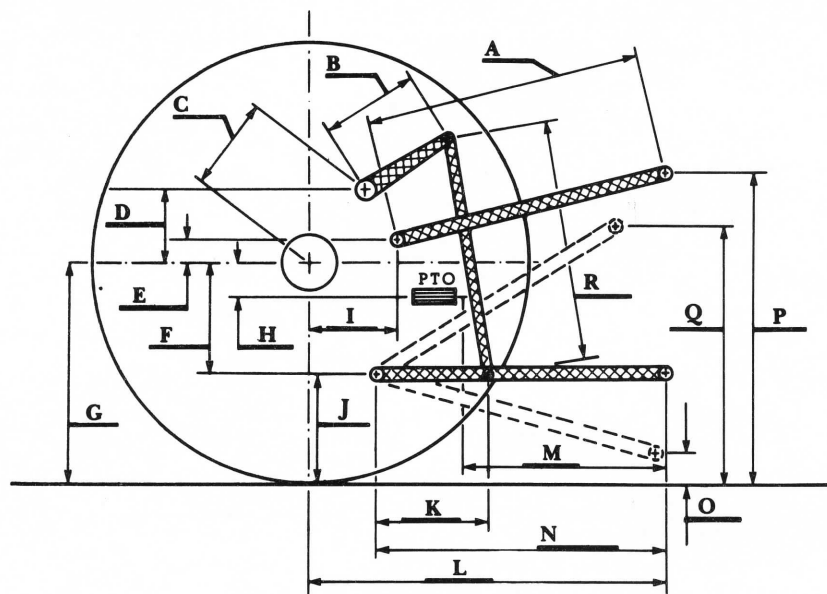
Engineer-in-Charge

K. VON BARGEN

W. E. SPLINTER

L. L. BASHFORD

Board of Tractor Test Engineers



Hitch Dimensions as Tested — No Load

	inch	mm
A	31.4	797
B	10.5	267
C	11.9	302
D	9.2	234
E	8.1	206
F	8.4	213
G	29.2	740
H	5.0	127
I	7.3	185
J	20.8	527
K	21.5	546
L	38.8	984
M	23.4	594
N	40.0	1016
O	8.0	203
P	39.8	1010
Q	33.1	841
R	27.8	705



Massey Ferguson 698 Diesel