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Test 1539: Massey-Ferguson 690 Diesel 12-Speed

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NEBRASKA TRACTOR TEST 1539—MASSEY FERGUSON 690 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—627 rpm)								
65.68 (48.98)	2200	4.511 (17.075)	0.479 (0.291)	14.56 (2.868)	182 (83.3)	64 (17.7)	75 (23.9)	29.00 (97.93)
Standard Power Take-off Speed (540 rpm)—One Hour								
62.25 (46.42)	1893	4.012 (15.187)	0.450 (0.274)	15.51 (3.057)	185 (84.7)	63 (17.3)	75 (24.0)	29.00 (97.93)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
57.87 (43.15)	2281	3.991 (15.107)	0.481 (0.293)	14.50 (2.857)	176 (80.0)	63 (16.9)	75 (23.9)	..... (97.93)
0.00 (0.00)	2356	1.501 (5.681)	..... (0.293)	..... (2.857)	160 (71.1)	64 (17.8)	75 (23.6)	..... (97.93)
29.46 (21.97)	2323	2.563 (9.702)	0.607 (0.369)	11.49 (2.264)	164 (73.3)	65 (18.3)	75 (23.9)	..... (97.93)
66.21 (49.37)	2201	4.524 (17.125)	0.477 (0.290)	14.64 (2.883)	182 (83.1)	65 (18.3)	75 (23.9)	..... (97.93)
14.85 (11.08)	2342	1.931 (7.309)	0.907 (0.552)	7.69 (1.515)	163 (72.8)	65 (18.3)	75 (23.9)	..... (97.93)
43.85 (32.70)	2304	3.234 (12.241)	0.514 (0.313)	13.56 (2.671)	168 (75.6)	65 (18.3)	75 (23.9)	..... (97.93)
Av 35.37 Av (26.38)	2301	2.957 (11.194)	0.583 (0.355)	11.96 (2.356)	169 (76.0)	64 (18.0)	75 (23.8)	29.00 (97.94)

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											
53.36 (39.79)	4192 (18.65)	4.77 (7.68)	2200	6.47	4.444 (16.822)	0.581 (0.353)	12.01 (2.366)	182 (83.3)	67 (19.2)	76 (24.4)	28.73 (97.02)
75% of Pull at Maximum Power—Ten Hours 7th (1LH) Gear											
43.55 (32.47)	3230 (14.37)	5.06 (8.14)	2289	4.79	3.694 (13.984)	0.592 (0.360)	11.79 (2.322)	170 (76.4)	48 (8.7)	52 (11.3)	28.82 (97.32)
50% of Pull at Maximum Power—Two Hours 7th (1LH) Gear											
29.84 (22.25)	2153 (9.58)	5.20 (8.36)	2318	3.45	3.039 (11.504)	0.710 (0.432)	9.82 (1.934)	170 (76.4)	39 (3.6)	43 (6.1)	29.18 (98.54)
50% of Pull at Reduced Engine Speed—Two Hours 9th (2LH) Gear											
29.76 (22.19)	2153 (9.57)	5.18 (8.34)	1540	3.25	2.251 (8.519)	0.528 (0.321)	13.22 (2.605)	172 (77.5)	42 (5.3)	50 (9.7)	29.21 (98.62)
MAXIMUM POWER IN SELECTED GEARS											
43.09 (32.13)	7650 (34.03)	2.11 (3.40)	2278	14.65	4th (2HL) Gear			171 (76.9)	62 (16.7)	67 (19.4)	28.72 (96.98)
53.27 (39.72)	6538 (29.08)	3.06 (4.92)	2198	10.91	5th (3LL) Gear			179 (81.4)	63 (17.2)	68 (20.0)	28.72 (96.98)
53.54 (39.92)	4973 (22.12)	4.04 (6.50)	2200	7.83	6th (3HL) Gear			180 (82.2)	63 (17.2)	68 (20.0)	28.72 (96.98)
54.78 (40.85)	4306 (19.15)	4.77 (7.68)	2200	6.51	7th (1LH) Gear			180 (82.2)	65 (18.3)	70 (21.1)	28.73 (97.02)
53.19 (39.66)	3220 (14.32)	6.19 (9.97)	2199	4.87	8th (1HH) Gear			179 (81.7)	64 (17.8)	69 (20.6)	28.72 (96.98)
53.08 (39.58)	2711 (12.06)	7.34 (11.82)	2200	4.13	9th (2LH) Gear			179 (81.4)	64 (17.8)	69 (20.6)	28.73 (97.02)
50.23 (37.45)	1987 (8.84)	9.48 (15.26)	2201	3.04	10th (2HH) Gear			178 (81.1)	65 (18.3)	70 (21.1)	28.73 (97.02)

Department of Agricultural Engineering

Dates of Test: September 14-25, 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) 0.8378 Fuel weight 6.976 lbs/gal (0.836 kg/l) Oil SAE 15W-40 API service classification SE, CC, CD To motor 1.850 gal (7.003 l) Drained from motor 1.605 gal (6.076 l) Transmission and final drive lubricant Massey Ferguson Permatran III fluid Total time engine was operated 41.5 hours.

ENGINE: Make Perkins Diesel Type four cylinder vertical Serial No. LF31109U931357K Crankshaft lengthwise Rated rpm 2200 Bore and stroke 3.975" × 5.0" (101 mm × 127 mm) Compression ratio 16 to 1 Displacement 248 cu in (4065 ml) Starting system 12 volt Lubrication pressure Air cleaner two paper elements Oil filter one full flow cartridge Oil cooler radiator for hydraulic and transmission fluid, radiator for power steering fluid Fuel filter one paper element Muffler vertical Cooling medium temperature control one thermostat.

CHASSIS: Type front wheel assist Serial No. Δ690RU K325022 Δ Tread width rear 56" (1422 mm) to 90" (2286 mm) front 63" (1598 mm) to 71" (1812 mm) Wheel base 90" (2286 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 40.2" (1020 mm) Vertical distance above roadway 38.5" (978 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 (2.6) third 1.9 (3.0) fourth 2.4 (3.9) fifth 3.5 (5.6) sixth 4.4 (7.1) seventh 5.2 (8.3) eighth 6.6 (10.6) ninth 7.7 (12.4) tenth 9.9 (15.9) eleventh 14.2 (22.8) twelfth 18.1 (29.1) reverse 1.9 (3.0), 2.4 (3.9), 7.7 (12.4), 9.9 (15.9) 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 165.5" (4.20 m) left 165" (4.19 m) (on concrete surface without brake) right 194.5" (4.94 m) left 195" (4.95 m) Turning space diameter (on concrete surface with brake applied) right 345" (8.76 m) left 344" (8.74 m) (on concrete surface without brake) right 403" (10.24 m) left 404" (10.26 m) Power take-off 540 rpm at 1893 engine rpm and 1000 rpm at 1900 engine rpm Unladen tractor mass 7845 lb (3558 kg).

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

LUGGING ABILITY IN 7th (1LH) GEAR

Crankshaft Speed rpm	2200	1982	1756	1538	1313	1095	874
Pull—lbs (kN)	4306 (19.15)	4661 (20.73)	4968 (22.10)	5221 (23.22)	5436 (24.18)	5468 (24.32)	5235 (23.29)
Increase in Pull %	0	8	15	21	26	27	22
Power—Hp (kW)	54.78 (40.85)	53.09 (39.59)	49.87 (37.19)	45.64 (34.03)	40.39 (30.12)	33.85 (25.24)	25.98 (19.37)
Speed—Mph (km/h)	4.77 (7.68)	4.27 (6.87)	3.76 (6.06)	3.28 (5.28)	2.79 (4.48)	2.32 (3.74)	1.86 (2.99)
Slip %	6.51	7.27	7.52	8.15	8.52	8.64	8.27

Front Wheel Drive

TRACTOR SOUND LEVEL WITH CAB	Engaged dB(A)	Disengaged dB(A)
Maximum Available Power—Two Hours	80.5	81.0
75% of Pull at Maximum Power—Ten Hours		80.0
50% of Pull at Maximum Power—Two Hours		81.0
50% of Pull at Reduced Engine Speed—Two Hours		77.0
Bystander in 12th (3HH) gear		86.5

**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 7th (1LH) Gear											
52.38 (39.06)	3960 (17.61)	4.96 (7.98)	2200	4.87	4.437 (16.795)	0.591 (0.359)	11.81 (2.326)	183 (83.9)	67 (19.4)	77 (24.7)	28.73 (97.02)

MAXIMUM POWER IN SELECTED GEARS

42.54 (31.72)	9437 (41.98)	1.69 (2.72)	2284	14.79	3rd (2LL) Gear			169 (76.1)	61 (16.1)	66 (18.9)	28.71 (96.95)
52.92 (39.46)	4008 (17.83)	4.95 (7.97)	2199	5.08	7th (1LH) Gear			180 (81.9)	65 (18.3)	70 (21.1)	28.73 (97.02)

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires	Two 18.4-30; 6; 16 (110)	Two 18.4-30; 6; 16 (110)
Ballast	1090 lb (494 kg)	None
	—Cast Iron (each)	None
Front Tires	Two 13.6-24; 6; 22 (150)	Two 13.6-24; 6; 22 (150)
Ballast	None	None
	—Cast Iron (each)	47 lb (22 kg)
Height of Drawbar	17 in (430 mm)	17 in (430 mm)
Static Weight with Operator—Rear	6700 lb (3039 kg)	4520 lb (2050 kg)
—Front	3595 lb (1631 kg)	3500 lb (1588 kg)
—Total	10295 lb (4670 kg)	8020 lb (3638 kg)

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	3100	21370
Location	trailer tipping connection	
Hydraulic oil temperature °F (°C)	189	87
Location	sump	

	Maximum Lift Capacity	Lift Capacity for Transport
QUICK ATTACH CATEGORY	no	
	II	*not measured
LOAD lbs (kg)	3598	1632
TIME sec	2.62	

HITCH POINT MOVEMENT in (mm)

Lowest position	12.6	321
Top of timed range	36.6	930
Highest position	37.1	943

LOAD CG MOVEMENT in (mm)

Lowest position	11.6	295
Top of timed range	40.6	1032
Highest position	41.1	1043

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

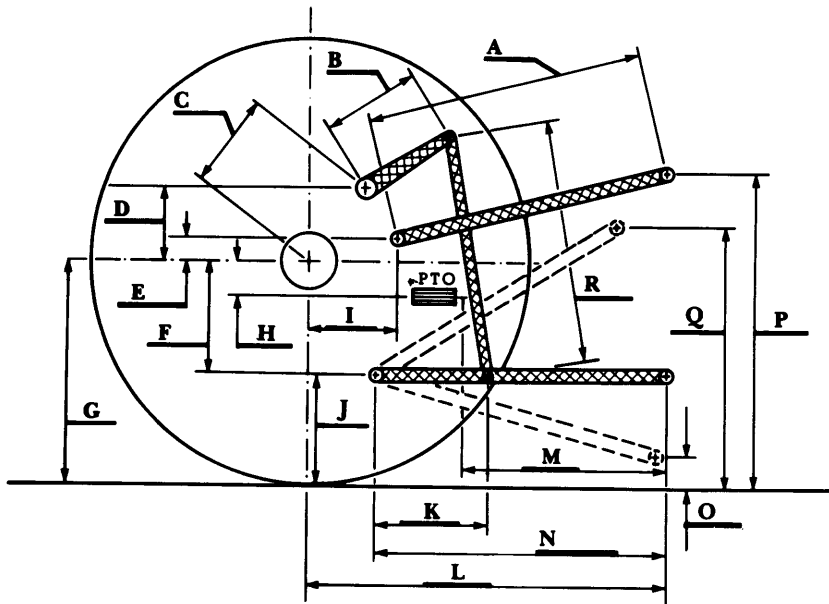
REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 153°F (67.0°C). 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. 1539, December 3, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

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

Board of Tractor Test Engineers



	inch	mm
A	29.5	749
B	10.5	267
C	11.9	302
D	8.3	211
E	7.2	183
F	9.3	236
G	27.6	701
H	5.9	150
I	7.3	185
J	18.3	465
K	19.8	503
L	36.8	933
M	27.4	696
N	38.0	965
O	8.0	203
P	37.3	947
Q	34.5	876
R	26.4	671

Hitch Dimensions as Tested — No Load



Massey Ferguson 690 Diesel

The Agricultural Experiment Station
 Institute of Agriculture and Natural Resources
 University of Nebraska—Lincoln
 Irvin T. Omtvedt, Dean and Director