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Test 1541: Massey-Ferguson 699 Diesel 12-Speed

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1541—MASSEY FERGUSON 699 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) | | | | | | | | |
| 85.79 (63.98) | 2200 | 5.346 (20.233) | 0.434 (0.264) | 16.05 (3.162) | 178 (81.1) | 64 (17.6) | 75 (24.1) | 29.00 (97.93) |
| Standard Power Take-off Speed (540 rpm)—One Hour | | | | | | | | |
| 78.00 (58.17) | 1894 | 4.598 (17.405) | 0.411 (0.250) | 16.96 (3.342) | 177 (80.5) | 65 (18.3) | 74 (23.4) | 29.02 (98.00) |
| VARYING POWER AND FUEL CONSUMPTION—Two Hours | | | | | | | | |
| 76.19 (56.82) | 2299 | 4.875 (18.454) | 0.446 (0.271) | 15.63 (3.079) | 176 (80.0) | 69 (20.3) | 79 (26.1) | |
| 0.00 (0.00) | 2389 | 1.812 (6.857) | | | 171 (76.9) | 64 (17.8) | 76 (24.2) | |
| 38.75 (28.90) | 2337 | 3.197 (12.102) | 0.575 (0.350) | 12.12 (2.388) | 172 (77.8) | 64 (17.8) | 75 (23.6) | |
| 85.71 (63.91) | 2201 | 5.336 (20.197) | 0.434 (0.264) | 16.06 (3.164) | 178 (81.1) | 67 (19.2) | 78 (25.3) | |
| 19.58 (14.60) | 2364 | 2.380 (9.007) | 0.847 (0.515) | 8.23 (1.621) | 172 (77.5) | 66 (18.9) | 76 (24.2) | |
| 57.50 (42.88) | 2313 | 3.989 (15.099) | 0.484 (0.294) | 14.42 (2.840) | 174 (78.6) | 65 (18.1) | 76 (24.4) | |
| Av 46.29 Av (34.52) | 2317 | 3.598 (13.619) | 0.542 (0.330) | 12.87 (2.534) | 174 (78.7) | 66 (18.7) | 76 (24.6) | 29.03 (98.01) |

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 | | | | | | | | | | | |
| 70.52 (52.59) | 5632 (25.05) | 4.70 (7.56) | 2199 | 7.42 | 5.221 (19.763) | 0.516 (0.314) | 13.51 (2.661) | 174 (78.9) | 40 (4.2) | 49 (9.2) | 29.33 (99.03) |
| 75% of Pull at Maximum Power—Ten Hours 7th (1LH) Gear | | | | | | | | | | | |
| 57.76 (43.07) | 4296 (19.11) | 5.04 (8.11) | 2311 | 5.34 | 4.563 (17.271) | 0.551 (0.335) | 12.66 (2.494) | 174 (78.7) | 45 (7.1) | 50 (9.7) | 29.20 (98.59) |
| 50% of Pull at Maximum Power—Two Hours 7th (1LH) Gear | | | | | | | | | | | |
| 39.59 (29.52) | 2864 (12.74) | 5.18 (8.34) | 2335 | 3.78 | 3.722 (14.089) | 0.655 (0.399) | 10.64 (2.095) | 172 (77.8) | 38 (3.1) | 44 (6.4) | 29.43 (99.38) |
| 50% of Pull at Reduced Engine Speed—Two Hours 9th (2LH) Gear | | | | | | | | | | | |
| 39.62 (29.54) | 2863 (12.74) | 5.19 (8.35) | 1558 | 3.68 | 2.869 (10.859) | 0.505 (0.307) | 13.81 (2.720) | 172 (77.8) | 40 (4.2) | 50 (9.7) | 29.42 (99.33) |
| MAXIMUM POWER IN SELECTED GEARS | | | | | | | | | | | |
| 50.64 (37.76) | 8718 (38.78) | 2.18 (3.51) | 2307 | 12.22 | 4th (2HL) Gear | | | 173 (78.1) | 38 (3.3) | 45 (7.2) | 29.42 (99.35) |
| 68.83 (51.33) | 8606 (38.28) | 3.00 (4.83) | 2201 | 12.10 | 5th (3LL) Gear | | | 174 (78.6) | 38 (3.3) | 45 (7.2) | 29.42 (99.35) |
| 69.41 (51.76) | 6571 (29.23) | 3.96 (6.38) | 2200 | 8.70 | 6th (3HL) Gear | | | 174 (78.9) | 39 (3.9) | 48 (8.9) | 29.38 (99.21) |
| 71.71 (53.47) | 5728 (25.48) | 4.69 (7.56) | 2200 | 7.52 | 7th (1LH) Gear | | | 174 (78.9) | 40 (4.4) | 49 (9.4) | 29.31 (98.98) |
| 69.57 (51.88) | 4286 (19.06) | 6.09 (9.80) | 2199 | 5.78 | 8th (1HH) Gear | | | 174 (78.9) | 39 (3.9) | 48 (8.9) | 29.38 (99.21) |
| 69.76 (52.02) | 3612 (16.07) | 7.24 (11.66) | 2200 | 4.88 | 9th (2LH) Gear | | | 174 (78.9) | 39 (3.9) | 48 (8.9) | 29.36 (99.14) |
| 66.45 (49.55) | 2673 (11.89) | 9.32 (15.01) | 2201 | 3.82 | 10th (2HH) Gear | | | 174 (78.9) | 39 (3.9) | 48 (8.9) | 29.36 (99.14) |

Department of Agricultural Engineering

Dates of Test: September 6-28, 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, SF, CC, CD To motor 3.626 gal (13.727 l) Drained from motor 3.247 gal (12.293 l) Transmission and final drive lubricant Massey Ferguson Permatran III fluid Total time engine was operated 51.5 hours.

ENGINE: Make Perkins Diesel Type six cylinder vertical Serial No. TWU708782K Crankshaft lengthwise Rated rpm 2200 Bore and stroke 3.875" × 5.0" (98.4 mm × 127 mm) Compression ratio 16.0 to 1 Displacement 354 cu in (5802 ml) Starting system 12 volt Lubrication pressure Air cleaner two paper elements and centrifugal precleaner 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 two thermostats.

CHASSIS: Type front wheel assist Serial No. Δ699RUT105043Δ Tread width rear 60" (1524 mm) to 96" (2438 mm) front 66" (1682 mm) to 74" (1886 mm) Wheel base 101.4" (2576 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 39.0" (990 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 (2.9) fourth 2.3 (3.7) fifth 3.4 (5.4) sixth 4.3 (6.9) seventh 5.0 (8.0) eighth 6.4 (10.2) ninth 7.5 (12.1) tenth 9.5 (15.3) eleventh 13.8 (22.1) twelfth 17.5 (28.2) reverse 1.8 (2.9), 2.3 (3.7), 7.5 (12.1), 9.5 (15.3) 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 180.5" (4.58 m) left 183" (4.65 m) (on concrete surface without brake) right 208.5" (5.30 m) left 213.5" (5.42 m) Turning space diameter (on concrete surface with brake applied) right 376" (9.55 m) left 381" (9.68 m) (on concrete surface without brake) right 432" (10.97 m) left 442" (11.23 m) Power take-off 540 rpm at 1894 engine rpm and 1000 rpm at 1900 engine rpm Unladen tractor mass 10150 lb (4604 kg).

LUGGING ABILITY IN 7th (1LH) GEAR

| | | | | | | |
|----------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Crankshaft Speed rpm | 2200 | 1981 | 1755 | 1542 | 1318 | 1094 |
| Pull—lbs (kN) | 5728 (25.48) | 5950 (26.47) | 6179 (27.49) | 6315 (28.09) | 6519 (29.00) | 6386 (28.41) |
| Increase in Pull % | 0 | 4 | 8 | 10 | 14 | 11 |
| Power—Hp (kW) | 71.71 (53.47) | 66.81 (49.82) | 61.27 (45.69) | 54.90 (40.94) | 48.29 (36.01) | 39.35 (29.34) |
| Speed—Mph (km/h) | 4.69 (7.56) | 4.21 (6.78) | 3.72 (5.98) | 3.26 (5.25) | 2.78 (4.47) | 2.31 (3.72) |
| Slip % | 7.52 | 7.66 | 8.05 | 8.31 | 8.57 | 8.44 |

Front Wheel Drive

| TRACTOR SOUND LEVEL WITH CAB | Engaged dB(A) | Disengaged dB(A) |
|---|---------------|------------------|
| Maximum Available Power—Two Hours | 82.0 | 81.5 |
| 75% of Pull at Maximum Power—Ten Hours | | 82.5 |
| 50% of Pull at Maximum Power—Two Hours | | 82.5 |
| 50% of Pull at Reduced Engine Speed—Two Hours | | 79.5 |
| Bystander in 12th (3HH) gear | | 88.5 |

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) | Cool- ing med | Temp. °F (°C) Air wet bulb | Air dry bulb | Barom. inch Hg (kPa) |
|---|--------------------------------|------------------------|---------------------------------|-----------|-------------------------------------|-----------------------|-----------------------|---------------------|-------------------------------------|--------------------|----------------------------|
| Maximum Available Power—Two Hours 7th (1LH) Gear | | | | | | | | | | | |
| 69.33 (51.70) | 5328 (23.70) | 4.88 (7.85) | 2200 | 5.75 | 5.207 (19.709) | 0.524 (0.318) | 13.32 (2.623) | 175 (79.2) | 40 (4.4) | 49 (9.4) | 29.28 (98.87) |

MAXIMUM POWER IN SELECTED GEARS

| | | | | | | | | | |
|------------------|------------------|----------------|------|-------|----------------|---------------|-------------|-------------|------------------|
| 65.81 (49.08) | 11620 (51.69) | 2.12 (3.42) | 2275 | 14.91 | 4th (2HL) Gear | 173 (78.3) | 38 (3.3) | 45 (7.2) | 29.42 (99.35) |
| 70.36 (52.47) | 5403 (24.03) | 4.88 (7.86) | 2201 | 5.82 | 7th (1LH) Gear | 175 (79.4) | 40 (4.4) | 49 (9.4) | 29.30 (98.94) |

TIRES, BALLAST AND WEIGHT

| | | | |
|---|-----------------------------|--------------------------|--------------------------|
| Rear Tires | —No., size, ply & psi (kPa) | With Ballast | Without Ballast |
| Ballast | —Liquid (each) | Two 18.4-34; 6; 16 (110) | Two 18.4-34; 6; 16 (110) |
| | —Cast Iron (each) | 1050 lb (476 kg) | None |
| | | 210 lb (95 kg) | None |
| Front Tires | —No., size, ply & psi (kPa) | Two 14.9-24; 6; 20 (140) | Two 14.9-24; 6; 20 (140) |
| Ballast | —Liquid (each) | None | None |
| | —Cast Iron (each) | 45 lb (21 kg) | None |
| Height of Drawbar | | 17 in (430 mm) | 17 in (430 mm) |
| Static Weight with Operator—Rear | | 8945 lb (4057 kg) | 6425 lb (2914 kg) |
| | —Front | 3990 lb (1810 kg) | 3900 lb (1769 kg) |
| | —Total | 12935 lb (5867 kg) | 10325 lb (4683 kg) |

THREE POINT HITCH PERFORMANCE

| | | |
|-------------------------------------|------------------------------|--|
| Observed Maximum Pressure psi (kPa) | 3100 | 21370 |
| Location | trailer tipping connection | |
| Hydraulic oil temperature °F (°C) | 193 | 89 |
| Location | sump | |
| | Maximum Lift Capacity | Lift Capacity for Transport |
| QUICK ATTACH CATEGORY | no II | *not measured |
| LOAD lbs (kg) | 5212 | 2364 |
| TIME sec | 5.05 | |
| HITCH POINT MOVEMENT in (mm) | | |
| Lowest position | 12.6 | 321 |
| Top of timed range | 36.8 | 933 |
| Highest position | 37.4 | 949 |
| LOAD CG MOVEMENT in (mm) | | |
| Lowest position | 11.2 | 284 |
| Top of timed range | 39.0 | 991 |
| Highest position | 39.8 | 1011 |

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

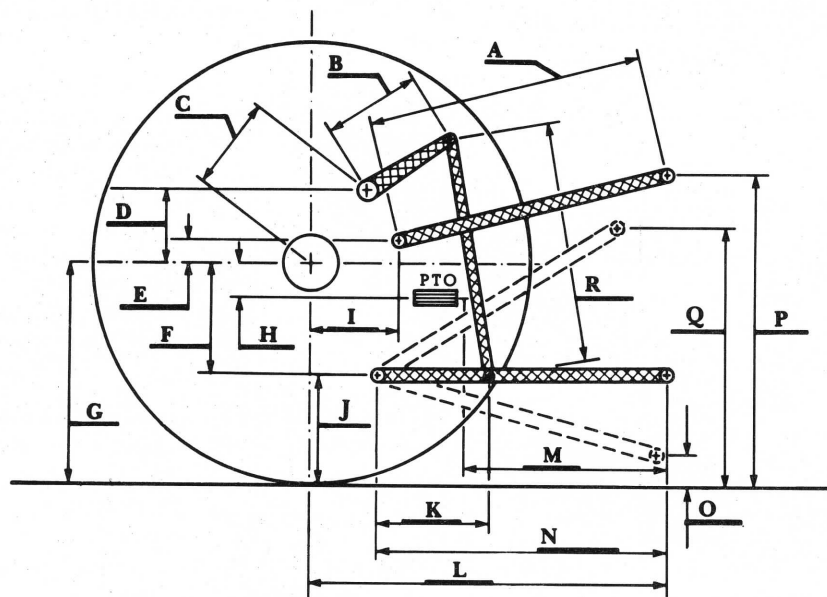
REPAIRS and ADJUSTMENTS: No repairs or adjustments.

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 151°F (66.4°C). Seven gears were chosen between tire tangential pull limit and 15% slip. During the warmup on the drawbar, a wrong gear ratio was discovered. The gear set was replaced and tests continued.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1541, 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 | 31.8 | 806 |
| B | 10.5 | 267 |
| C | 11.9 | 302 |
| D | 9.2 | 234 |
| E | 8.1 | 206 |
| F | 8.4 | 213 |
| G | 28.8 | 731 |
| H | 5.0 | 127 |
| I | 7.3 | 185 |
| J | 20.4 | 518 |
| K | 21.5 | 546 |
| L | 38.8 | 984 |
| M | 23.4 | 594 |
| N | 40.0 | 1016 |
| O | 8.0 | 203 |
| P | 39.4 | 1000 |
| Q | 33.5 | 851 |
| R | 27.8 | 705 |



Massey Ferguson 699 Diesel