

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

January 2005

Test 1851: Massey Ferguson 491 and 593 Diesel 12-Speed

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Energy Systems Commons](#), [History of Science, Technology, and Medicine Commons](#), [Other Mechanical Engineering Commons](#), [Physical Sciences and Mathematics Commons](#), [Science and Mathematics Education Commons](#), and the [United States History Commons](#)

Nebraska Tractor Test Lab, "Test 1851: Massey Ferguson 491 and 593 Diesel 12-Speed" (2005). *Nebraska Tractor Tests*. 2108.

<https://digitalcommons.unl.edu/tractormuseumlit/2108>

This Article is brought to you for free and open access by the Tractor Test and Power Museum, The Lester F. Larsen at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Tractor Tests by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

NEBRASKA TRACTOR TEST 1851

MASSEY FERGUSON 491 DIESEL

ALSO MASSEY FERGUSON 593 DIESEL

12 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
---------------------	--------------------------------	-----------------	-----------------------	-----------------------	--------------------------------

MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—(PTO speed—1158 rpm)					
78.81 (58.77)	2200	4.95 (18.73)	0.441 (0.268)	15.92 (3.14)	
Maximum Power (1 hour)					
85.87 (64.03)	2100	5.18 (19.62)	0.424 (0.258)	16.56 (3.26)	
Standard Power Take-off Speed -(1000 rpm)					
84.16 (62.76)	1900	4.86 (18.40)	0.406 (0.247)	17.31 (3.41)	

VARYING POWER AND FUEL CONSUMPTION

78.81 (58.77)	2200	4.95 (18.73)	0.441 (0.268)	15.92 (3.14)	Air temperature
67.83 (50.58)	2219	4.46 (16.87)	0.461 (0.281)	15.22 (3.00)	75°F (24°C)
50.85 (37.92)	2231	3.70 (14.01)	0.511 (0.311)	13.74 (2.71)	Relative humidity
34.23 (25.53)	2239	2.88 (10.88)	0.590 (0.359)	11.91 (2.35)	58%
16.92 (12.62)	2251	2.09 (7.92)	0.869 (0.528)	8.09 (1.59)	Barometer
1.70 (1.27)	2259	1.48 (5.60)	6.125 (3.726)	1.15 (0.23)	28.87"Hg (97.77 kPa)

Maximum torque 282 lb.-ft. (383 Nm) at 1199 rpm
Maximum torque rise -50.0%
Torque rise at 1800 rpm -28%

TRACTOR SOUND LEVEL WITHOUT CAB	Front wheel drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 6th(3LH) gear	94.7	94.7
Bystander in 12th(3HH) gear		87.6

TIRES AND WEIGHT

Rear Tires—No., size, ply & psi (kPa)
Front Tires—No., size, ply & psi (kPa)
Height of Drawbar
Static Weight with operator—Rear
—Front
—Total

Tested Without Ballast
Two 18.4-30; 8; 16 (110)
Two 12.4-24; 6; 20 (135)
18.0 in (455 mm)
4505 lb (2044 kg)
3105 lb (1408 kg)
7610 lb (3452 kg)

Location of tests: Nebraska Tractor Test Laboratory, University of Nebraska, Lincoln Nebraska 68583-0832

Dates of tests: May 25-26, 2005

Manufacturer: AGCO Corporation, 4205 River Green Parkway, Duluth, Georgia 30096

FUEL, OIL and TIME: Fuel No. 2 Diesel Specific gravity converted to 60°/60°F (15°/15°C) 0.8437 Fuel weight 7.025 lbs/gal (0.842 kg/l) Oil SAE 15W40 API service classification CE/CF-4 Transmission and hydraulic lubricant AGCO Power Fluid 821 XL fluid Total time engine was operated 10.0 hours

ENGINE: Make Perkins Diesel Type four cylinder vertical with turbocharger Serial No. RG37828*B503638M* Crankshaft lengthwise Rated engine speed 2200 Bore and stroke 4.134" x 5.00" (105.0 mm x 127.0 mm) Compression ratio 18.2 to 1 Displacement 268 cu in (4400 ml) Starting system 12 volt Lubrication pressure Air cleaner two paper elements Oil filter one full flow cartridge Fuel filter one paper element and water separator Muffler underhood Exhaust vertical Cooling medium temperature control one thermostat

ENGINE OPERATING PARAMETERS: Fuel rate: 34.0 - 35.7 lb/h (15.4 - 16.2 kg/h) High idle: 2250 - 2350 rpm Turbo boost: nominal 9.7-11.7 psi (67 - 81 kPa) as measured 10.8 psi (74 kPa)

CHASSIS: Type front wheel assist Serial No. 8027BP11089 Tread width rear 64.0" (1626 mm) to 88.1" (2238 mm) front 66.1" (1680 mm) to 83.5" (2120 mm) Wheelbase 90.2" (2290 mm) Hydraulic control system direct engine drive Transmission selective gear fixed ratio Nominal travel speeds mph (km/h) first 1.34 (2.16) second 1.65 (2.65) third 1.98 (3.18) fourth 2.43 (3.91) fifth 3.73 (6.00) sixth 4.57 (7.37) seventh 5.49 (8.83) eighth 6.75 (10.86) ninth 8.08 (13.01) tenth 9.94 (16.00) eleventh 15.25 (24.54) twelfth 18.75 (30.17) reverse 1.92 (3.09), 2.36 (3.80), 7.85 (12.63), 9.65 (15.53) Clutch single dry disc operated by foot pedal Brakes multiple wet disc hydraulically operated by two foot pedals which can be locked together Steering hydrostatic Power take-off 540 rpm at 1908 engine rpm or 1000 rpm at 1900 engine rpm Unladen tractor mass 7435 lb (3372 kg)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: II

Quick Attach: None

Maximum force exerted through whole range:	3682 lbs (16.4 kN)	
i) Opening pressure of relief valve:	NA	<u>Auxiliary and linkage pumps combined</u>
	<u>Auxiliary pump</u>	
Sustained pressure of the open relief valve:	2445 psi (169 bar)	2580 psi (178 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	10.0 GPM (37.9 l/min)	17.9 GPM (67.8 l/min)
iii) Pump delivery rate at maximum hydraulic power:	8.9 GPM (33.7 l/min)	15.4 GPM (58.3 l/min)
Delivery pressure:	1676 psi (116 bar)	1971 psi (136 bar)
Power:	8.7 HP (6.5 kW)	17.7 HP (13.2 kW)

THREE POINT HITCH PERFORMANCE

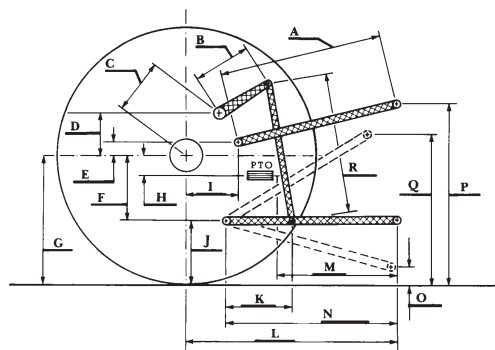
Observed maximum pressure psi. (bar)	2950 (203)
Location:	lift cylinder
Hydraulic oil temperature: °F (°C)	149 (65)
Location:	hydraulic valve
Category:	II
Quick attach:	none

SAE Static Test—System pressure 2655 psi (183 Bar)

Hitch point distance to ground level in. (mm)	8.0 (203)	15.0 (381)	22.0 (559)	29.0 (737)	36.0 (914)
Lift force on frame lb	4199	4519	4604	4465	4390
" " " " " (kN)	(18.7)	(20.1)	(20.5)	(19.9)	(19.5)

	SAE test		OECD test	
	inch	mm	inch	mm
A	32.8	833	33.2	843
B	10.5	267	10.5	267
C	12.0	304	12.0	304
D	9.1	232	9.1	232
E	8.0	204	8.0	204
F	8.3	212	8.3	212
G	30.3	770	30.3	770
H	5.0	127	5.0	127
I	6.9	175	6.9	175
J	22.0	558	22.0	558
K	31.4	797	31.4	797
L	41.8	1062	41.8	1062
M	30.0	762	30.0	762
N	43.2	1098	43.2	1098
O	8.0	203	8.0	203
P	41.0	1041	46.0	1168
Q	36.6	930	36.6	930
R	29.2	742	29.2	742

HITCH DIMENSIONS AS TESTED - NO LOAD



MASSEY FERGUSON 491 Diesel

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. This tractor did not meet the manufacturer's remote flow claims of 11.2 GPM (42.4 lpm) with auxiliary pump nor 18.5 GPM (70.4 lpm) with both pumps combined. For the maximum power tests, the fuel temperature at the injection pump inlet was maintained at 135°F (57°C).

Report reissued: Supplemental sales permit for Massey Ferguson 593 Diesel, October, 2006.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1851**, November 3, 2006.

Roger M. Hoy
Director

M.F. Kocher
V.I. Adamchuk
J.A. Smith
Board of Tractor Test Engineers