

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

---

January 2005

## Test 1863: Massey Ferguson 451 Diesel 8-Speed

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto: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 1863: Massey Ferguson 451 Diesel 8-Speed" (2005). *Nebraska Tractor Tests*. 2113.

<https://digitalcommons.unl.edu/tractormuseumlit/2113>

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 1863

## MASSEY FERGUSON 451 DIESEL

### 8 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—623 rpm)					
47.74 (35.60)	2200	3.05 (11.55)	0.451 (0.274)	15.64 (3.08)	
Standard Power Take-off Speed - (540 rpm)					
46.57 (34.72)	1909	2.80 (10.60)	0.424 (0.258)	16.62 (3.28)	

#### VARYING POWER AND FUEL CONSUMPTION

47.74 (35.60)	2200	3.05 (11.55)	0.451 (0.274)	15.64 (3.08)	Air temperature
42.71 (31.85)	2315	2.88 (10.90)	0.475 (0.289)	14.84 (2.92)	77°F (25°C)
32.41 (24.17)	2338	2.34 (8.86)	0.509 (0.310)	13.85 (2.73)	Relative humidity
21.56 (16.08)	2354	1.89 (7.14)	0.617 (0.375)	11.43 (2.25)	48%
10.78 (8.04)	2368	1.40 (5.31)	0.918 (0.559)	7.68 (1.51)	Barometer
0.96 (0.72)	2379	1.04 (3.92)	7.596 (4.620)	0.93 (0.18)	28.79"Hg (97.49 kPa)

Maximum Torque 148 lb.-ft. (201 Nm) at 1252 rpm  
Maximum Torque Rise - 30.1%  
Torque rise at 1801 rpm - 16%

TRACTOR SOUND LEVEL WITHOUT CAB	Front wheel drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 3rd(3L) gear	94.6	94.6
Bystander		--

#### 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 14.9-24; 6; 16 (110)  
Two 12.5/80-18; 10; 16 (110)  
12.5 in (315 mm)  
3180 lb (1442 kg)  
2400 lb (1089 kg)  
5580 lb (2531 kg)

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

**Dates of tests:** November 2-3, 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) 0.8468 Fuel weight 7.051 lbs/gal (0.845 kg/l) Oil SAE 15W40 API service classification CF-4 Transmission and hydraulic lubricant AGCO Power Fluid 821 XL fluid Total time engine was operated 6.0 hours

**ENGINE:** Make Perkins Diesel Type three cylinder vertical Serial No. DC38027\*U007845L\* Crankshaft lengthwise Rated engine speed 2200 Bore and stroke 4.134" x 5.00" (105.0 mm x 127.0 mm) Compression ratio 19.2 to 1 Displacement 201 cu in (3300 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 vertical Cooling medium temperature control one thermostat

**ENGINE OPERATING PARAMETERS:** Fuel rate: 20.6 - 22.4 lb/h (9.3 - 10.2 kg/h) High idle: 2300 - 2400 rpm

**CHASSIS:** Type Front wheel assist Serial No. 9362BP05061 Tread width rear 57.1" (1450 mm) to 72.0" (1875 mm) front 48.8" (1240 mm) to 59.0" (1500 mm) Wheelbase 78.7" (2000 mm) Hydraulic control system direct engine drive Transmission selective gear fixed ratio Nominal travel speeds mph (km/h) first 1.31 (2.11) second 1.91 (3.08) third 3.47 (5.59) fourth 4.28 (6.88) fifth 5.18 (8.34) sixth 7.64 (12.30) seventh 13.98 (22.50) eighth 17.13 (27.57) reverse 1.76 (2.83), 7.10 (11.43) Clutch single dry disc operated by foot pedal Brakes multiple wet disc operated by two foot pedals which can be locked together Steering hydrostatic Power take-off 540 rpm at 1908 engine rpm Unladen tractor mass 5405 lb (2452 kg)

### THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: I

Quick Attach: None

Maximum Force Exerted Through Whole Range: 2786 lbs (12.4 kN)

i) Opening pressure of relief valve: NA

Auxiliary pump

Sustained pressure of the open relief valve: 2632 psi (182 bar)

ii) Pump delivery rate at minimum pressure and rated engine speed: 10.3 GPM (39.0 l/min)

iii) Pump delivery rate at maximum hydraulic power: 9.9 GPM (37.5 l/min)

Delivery pressure: 1902 psi (131 bar)

Power: 11.0 HP (8.2 kW)

### THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi. (bar) 2220 (153)  
 Location: hydraulic manifold  
 Hydraulic oil temperature: °F (°C) 149 (65)  
 Location: hydraulic sump  
 Category: I  
 Quick attach: none

**SAE Static Test**—System pressure 2000 psi (138 Bar)

Hitch point distance to ground level in. (mm)	8.0 (203)	14.0 (355)	19.9 (505)	25.9 (657)	32.1 (815)
Lift force on frame lb	3278	3369	3281	3011	2678
" " " " " (kN)	(14.6)	(15.0)	(14.6)	(13.4)	(11.9)

**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. The manufacturer's claim of 13.9 GPM (52.5 lpm) hydraulic flow with auxiliary and lift pumps combined was not verified. The 3 point lift performance with the Category II setting was not verified. For the maximum power tests, the fuel temperature at the injection pump inlet was maintained at 136°F (58°C).

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1863**, January 17, 2006.

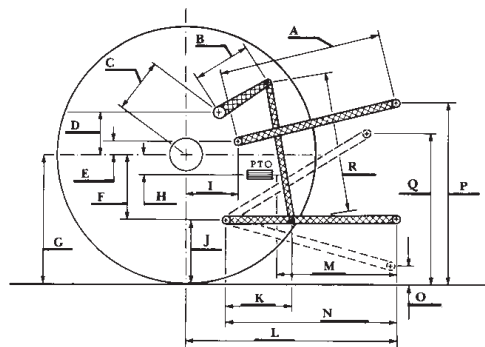
Leonard L. Bashford  
 Director

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

### SAE/OECD test

	inch	mm
A	24.5	622
B	10.5	267
C	12.0	304
D	9.1	232
E	8.0	204
F	8.3	212
G	23.4	595
H	3.8	95
I	6.9	175
J	15.1	383
K	19.1	484
L	32.8	834
M	21.0	534
N	34.3	870
O	8.0	203
P	33.2	843
Q	31.3	795
R	24.6	625

### HITCH DIMENSIONS AS TESTED - NO LOAD



**MASSEY FERGUSON 451 Diesel**

Institute of Agriculture and Natural Resources  
 University of Nebraska-Lincoln