

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

January 2006

Test 1870: John Deere 5103 Diesel 9-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 1870: John Deere 5103 Diesel 9-Speed" (2006). *Nebraska Tractor Tests*. 2099.

<https://digitalcommons.unl.edu/tractormuseumlit/2099>

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 1870

JOHN DEERE 5103 DIESEL

9 SPEED

Chassis S/N PY5103U001808 to PY5103U013641

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—545 rpm)					
43.70 (32.59)	2399	2.94 (11.13)	0.470 (0.286)	14.87 (2.93)	
Maximum Power (1 hour)					
46.45 (34.64)	2150	2.85 (10.78)	0.428 (0.261)	16.32 (3.21)	

VARYING POWER AND FUEL CONSUMPTION

43.70 (32.59)	2399	2.94 (11.13)	0.470 (0.286)	14.87 (2.93)	Air temperature
38.70 (28.86)	2503	2.76 (10.45)	0.499 (0.303)	14.02 (2.76)	75°F (24°C)
29.23 (21.80)	2528	2.35 (8.88)	0.561 (0.341)	12.46 (2.45)	Relative humidity
19.95 (14.87)	2563	1.69 (6.39)	0.592 (0.360)	11.82 (2.33)	18%
10.01 (7.47)	2581	1.23 (4.66)	0.859 (0.522)	8.14 (1.60)	Barometer
0.62 (0.46)	2600	0.89 (3.36)	10.035 (6.104)	0.70 (0.14)	28.29"Hg (95.80 kPa)

Maximum Torque 133 lb.-ft. (180 Nm) at 1351 rpm

Maximum Torque Rise - 38.9%

Torque rise at 1901 rpm - 26%

TRACTOR SOUND LEVEL WITHOUT CAB

	dB(A)
At no load in 5th(B2) gear	90.5
Transport speed - no load - 9th(C3) gear	92.0
Bystander in 9th(C3) gear	81.0

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 13.6-28; 8; 12 (85)
Two 7.50-16; 6; 28 (195)
14.5 in (370 mm)
3110 lb (1411 kg)
1780 lb (807 kg)
4890 lb (2218 kg)

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

Dates of tests: March 9 - 30, 2006

Manufacturer: John Deere Commercial Products Inc., 700 Horizon South Parkway, Grovetown Ga. USA, 30813

FUEL, OIL and TIME: Fuel No. 2 Diesel Specific gravity converted to 60°/60° F (15°/15°C) 0.8395 Fuel weight 6.990 lbs/gal (0.838 kg/l) Oil SAE 15W40 API service classification CG-4 Transmission and hydraulic lubricant John Deere Hy-Gard Fluid Total time engine was operated 8.0 hours

ENGINE: Make John Deere Diesel Type three cylinder vertical with turbocharger Serial No. *PY3029T106597* Crankshaft lengthwise Rated engine speed 2400 Bore and stroke 4.19" x 4.33" (106.4 mm x 110.0 mm) Compression ratio 17.8 to 1 Displacement 179 cu in (2934 ml) Starting system 12 volt Lubrication pressure Air cleaner one paper element and one polyester felt element Oil filter one full flow cartridge Fuel filter one paper element Muffler underhood Exhaust vertical Cooling medium temperature control one thermostat

ENGINE OPERATING PARAMETERS: Fuel rate: 20.0 - 21.0 lb/h (9.1 - 9.5 kg/h) High idle: 2575 - 2650 rpm Turbo boost: nominal 8.7 - 11.6 psi (60 - 80 kPa) as measured 10.0 psi (69 kPa)

CHASSIS: Type standard Serial No. *PY5103U009123* Tread width rear 55.7" (1415 mm) to 71.5" (1815 mm) front 56.3" (1430 mm) to 80.7" (2050 mm) Wheelbase 80.3" (2040 mm) Hydraulic control system direct engine drive Transmission selective gear fixed ratio Nominal travel speeds mph (km/h) first 1.26 (2.03) second 1.83 (2.94) third 2.75 (4.42) fourth 3.55 (5.71) fifth 5.11 (8.23) sixth 7.69 (12.37) seventh 8.20 (13.20) eighth 11.83 (19.03) ninth 17.77 (28.60) reverse 2.13 (3.42), 5.95 (9.58), 13.77 (22.17) Clutch single dry disc operated by foot pedal Brakes single wet disc mechanically operated by two foot pedals which can be locked together Steering hydrostatic Power take-off 540 rpm at 2376 engine rpm Unladen tractor mass 4715 lb (2139 kg)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: II

Quick Attach: None

Maximum force exerted through whole range: 3591 lbs (16.0 kN)

i) Opening pressure of relief valve: NA

Sustained pressure of the open relief valve: 2785 psi (192 bar)

ii) Pump delivery rate at minimum pressure and rated engine speed: 12.4 GPM (46.9 l/min)

iii) Pump delivery rate at maximum

hydraulic power: 12.2 GPM (46.2 l/min)

Delivery pressure: 2471 psi (170 bar)

Power: 17.6 HP (13.1 kW)

THREE POINT HITCH PERFORMANCE

Observed maximum pressure psi. (bar) 2796 (193)

Location: remote outlet

Hydraulic oil temperature: °F (°C) 185 (85)

Location: hydraulic sump

Category: II

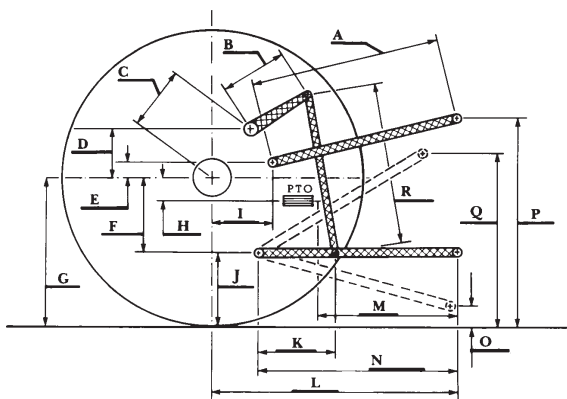
Quick attach: none

SAE Static Test—System pressure 2480 psi (171 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	6633	5486	5067	4734	3978
" " " " " (kN)	(29.5)	(24.4)	(22.5)	(21.1)	(17.7)

	SAE Test		OECD Test	
	inch	mm	inch	mm
A	23.3	590	23.5	597
B	11.0	280	11.0	280
C	13.7	347	13.7	347
D	11.8	300	11.8	300
E	13.2	335	13.2	335
F	6.9	175	6.9	175
G	26.4	670	26.4	670
H	0.4	10	0.4	10
I	15.7	397	15.7	397
J	19.5	495	19.5	495
K	16.1	410	16.1	410
L	38.6	980	38.6	980
M	21.7	550	21.7	550
N	32.6	830	32.6	830
O	8.0	203	8.0	203
P	38.6	980	43.5	1105
Q	32.5	825	32.5	825
R	21.2	540	21.2	540

HITCH DIMENSIONS AS TESTED - NO LOAD



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. For the maximum power tests, the fuel temperature at the injection pump inlet was maintained at 122°F (50°C).

Note: The performance figures on this report apply to chassis serial numbers PY5103U001808 through PY5103U013641.

Report reissued: The manufacturer's advertised power claim changed from 42 PTO hp to 38 PTO hp effective after chassis S/N PY5103U013641.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1870**, August 31, 2007.

Roger M. Hoy
Director

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



John Deere 5103 Diesel