

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

2016

Test 2142: John Deere 5100E

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 2142: John Deere 5100E" (2016). *Nebraska Tractor Tests*. 2574.
<https://digitalcommons.unl.edu/tractormuseumlit/2574>

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 2142

JOHN DEERE 5100E DIESEL

12 SPEED

CHASSIS SERIAL NUMBERS 400000 AND HIGHER

POWER TAKE-OFF PERFORMANCE

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

MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—(PTO speed—544 rpm)						
87.30 (65.10)	2403	5.72 (21.64)	0.459 (0.279)	15.27 (3.01)	0.20 (0.76)	Fuel used during active exhaust regeneration-0.70 gal (2.66 l) (see note 1, p.2)
Standard Power Take-off Speed (540 rpm)						
88.93 (66.31)	2385	5.71 (21.63)	0.450 (0.274)	15.56 (3.07)	0.20 (0.76)	
Maximum Power (1 hour)						
90.65 (67.60)	2204	5.41 (20.49)	0.418 (0.255)	16.75 (3.30)	0.22 (0.82)	

VARYING POWER AND FUEL CONSUMPTION

87.30 (65.10)	2403	5.72 (21.64)	0.459 (0.279)	15.27 (3.01)	0.20 (0.76)	Air temperature
75.55 (56.34)	2444	5.16 (19.54)	0.479 (0.291)	14.64 (2.88)	0.17 (0.65)	73°F (23°C)
57.21 (42.66)	2470	4.36 (16.50)	0.534 (0.325)	13.12 (2.59)	0.12 (0.44)	Relative humidity
38.56 (28.75)	2500	3.69 (13.96)	0.670 (0.408)	10.45 (2.06)	0.08 (0.32)	15%
19.33 (14.41)	2500	2.99 (11.33)	1.085 (0.660)	6.46 (1.27)	0.08 (0.31)	Barometer
0.71 (0.53)	2500	2.11 (7.99)	20.799 (12.652)	0.34 (0.07)	0.08 (0.30)	28.92" Hg (97.95 kPa)

Maximum torque - 255 lb.-ft. (346 Nm) at 1603 rpm

Maximum torque rise - 33.6%

Torque rise at 1921 engine rpm - 29%

Power increase at 2204 engine rpm - 3.8%

TRACTOR SOUND LEVEL WITH CAB

	Front Wheel Drive Engaged dB(A)	Disengaged dB(A)
At no load in 6th(B2) gear	88.8	88.7
Transport in 12th(C4) gear		90.7
Bystander in 12th(C4) gear		83.5

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; 12 (85)

Two 12.4-24; 8; 16 (110)

17.5 in (445 mm)

4655 lb (2111 kg)

3470 lb (1574 kg)

8125 lb (3685 kg)

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

Dates of tests: April 12 - 14, 2016

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

CONSUMABLE Fluids, OIL and TIME: Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8417 **Fuel weight** 7.008 lbs/gal (0.840 kg/l) **Diesel Exhaust Fluid (DEF)** 32% aqueous urea solution **DEF weight** 9.071 lbs/gal (1.087 kg/l) **Oil SAE 15W-40 API service classification CJ-4** **Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Front axle lubricant** John Deere Hy-Gard fluid **Total time engine was operated:** 11.5 hours

ENGINE: Make John Deere Diesel **Type** four cylinder vertical with turbocharger, air to air intercooler and D.E.F. (diesel exhaust fluid) exhaust treatment **Serial No.** *PE4045U018231* **Crankshaft** lengthwise **Rated engine speed** 2400 **Bore and stroke** 4.19" x 5.00" (106.5 mm x 127.0 mm) **Compression ratio** 19.0 to 1 **Displacement** 276 cu in (4525 ml) **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element and one polyester felt element **Oil filter** one full flow cartridge **Oil cooler** radiator for transmission and hydraulic oil **Fuel filter** one paper element and sediment bowl **Exhaust** regenerative aftertreatment system consisting of DOC (diesel oxidation catalyst) and SCR (selective catalyst reduction) integrated within a vertical muffler **Cooling medium temperature control** two thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 37.9 - 41.0 lb/h (17.2 - 18.6 kg/h) **High idle:** 2475 - 2525 rpm **Turbo boost:** nominal 18.9 - 21.0 psi (130 - 145 kPa) as measured 19.9 psi (137 kPa)

CHASSIS: **Type** front wheel assist **Serial No.** *1LV5100EVFY440712* **Tread width** rear 54.8" (1417 mm) to 71.7" (1820 mm) front 52.8" (1340 mm) to 75.0" (1904 mm) **Wheelbase** 90.6" (2300 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Nominal travel speeds mph (km/h)** first 1.04 (1.68) second 1.42 (2.29) third 1.94 (3.13) fourth 2.60 (4.19) fifth 3.02 (4.86) sixth 4.11 (6.61) seventh 5.60 (9.02) eighth 7.51 (12.08) ninth 8.72 (14.04) tenth 11.87 (19.11) eleventh 16.20 (26.08) twelfth 21.71 (34.94) reverse 1.14 (1.84), 1.55 (2.50), 2.12 (3.41), 2.84 (4.57), 3.30 (5.30), 4.48 (7.21), 6.11 (9.84), 8.19 (13.18), 9.51 (15.31), 12.95 (20.84), 17.68 (28.45), 23.68 (38.11)

HYDRAULIC PERFORMANCE

CATEGORY: II

Quick Attach: None

OECD Static test

Maximum force exerted through whole range: 3213 lbs (14.3 kN)

i) Maximum observed pressure: 2863 psi (197 bar)

two outlet sets combined

ii) Pump delivery rate at minimum pressure and rated engine speed: 16.0 GPM (60.5 l/min)

iii) Pump delivery rate at maximum hydraulic power: 14.9 GPM (56.3 l/min)

Delivery pressure: 2602 psi (179 bar)

Power: 22.6 HP (16.8 kW)

single outlet set

ii) Pump delivery rate at minimum pressure and rated engine speed: 15.9 GPM (60.2 l/min)

iii) Pump delivery rate at maximum hydraulic power: 15.0 GPM (56.6 l/min)

Delivery pressure: 2512 psi (173 bar)

Power: 21.9 HP (16.4 kW)

Clutch single wet disc operated by foot pedal

Brakes single wet disc hydraulically operated by two foot pedals which can be locked together

Steering hydrostatic **Power take-off** 540 rpm at 2385 engine rpm or 540 rpm at 1721 engine rpm

Unladen tractor mass 7950 lb (3606 kg)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

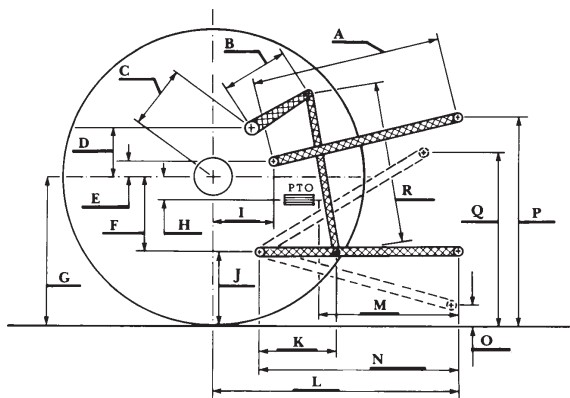
NOTE 1. The manufacturer declares that the average time between active regenerations is 50 hours. A 2% power loss was observed during the active exhaust regeneration.

NOTE 2: The performance data on this report applies to tractors with chassis serial numbers that end with 400000 and higher.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures.

HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	24.1	613
B	11.0	280
C	14.0	356
D	12.2	311
E	11.2	284
F	6.5	165
G	27.4	695
H	0.2	4
I	15.1	384
J	20.9	530
K	16.7	424
L	39.2	996
M	22.4	570
N	32.9	836
O	8.0	203
P	44.9	1140
Q	34.0	864
R	20.8	527



We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 2142, May 16, 2016

Roger M. Hoy
Director

M.F. Kocher
S.K. Pitla
P.J. Jasa
Board of Tractor Test Engineers

Economy mode

540 PTO rpm @ 1721 engine rpm

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	DEF Usage Gal/hr (l/h)
82.25 (61.34)	1721	4.38 (16.56)	0.373 (0.227)	18.80 (3.70)	0.21 (0.80)
61.83 (46.11)	1723	3.43 (12.98)	0.389 (0.236)	18.03 (3.55)	0.13 (0.51)
41.15 (30.69)	1722	2.55 (9.64)	0.433 (0.264)	16.17 (3.18)	0.07 (0.26)
20.61 (15.37)	1724	1.74 (6.60)	0.593 (0.360)	11.83 (2.33)	0.00 (0.01)
0.68 (0.50)	1724	1.14 (4.32)	11.827 (7.194)	0.59 (0.12)	0.01 (0.04)

Normal mode

540 PTO rpm @ 2385 engine rpm

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	DEF Usage Gal/hr (l/h)
82.26 (61.34)	2386	5.33 (20.18)	0.454 (0.276)	15.43 (3.04)	0.18 (0.67)
61.81 (46.09)	2388	4.35 (16.45)	0.493 (0.300)	14.22 (2.80)	0.13 (0.49)
41.29 (30.79)	2389	3.52 (13.31)	0.597 (0.363)	11.74 (2.31)	0.07 (0.27)
20.57 (15.34)	2388	2.65 (10.04)	0.904 (0.550)	7.75 (1.53)	0.04 (0.15)
0.62 (0.46)	2386	1.92 (7.26)	21.831 (13.279)	0.32 (0.06)	0.07 (0.25)



John Deere 5100E Diesel

Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln