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## Test 1619: John Deere 4455 Powershift Diesel 15-Speed

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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# NEBRASKA OECD TRACTOR TEST 1619—SUMMARY 057

## JOHN DEERE 4455 POWERSHIFT DIESEL

### 15 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
<b>MAXIMUM POWER AND FUEL CONSUMPTION</b>					
<b>Rated Engine Speed—(PTO speed—1002 rpm)</b>					
141.60 (105.59)	2200	8.38 (31.74)	0.409 (0.249)	16.89 (3.33)	
<b>Maximum Power (2 Hours)</b>					
146.86 (109.51)	1850	8.05 (30.48)	0.379 (0.231)	18.24 (3.59)	
<b>VARYING POWER AND FUEL CONSUMPTION</b>					
141.60 (105.59)	2200	8.38 (31.74)	0.409 (0.249)	16.89 (3.33)	Air temperature
					77°F (25°C)
122.85 (91.61)	2243	7.55 (28.59)	0.425 (0.258)	16.27 (3.20)	Relative humidity
93.33 (69.59)	2276	6.29 (23.82)	0.466 (0.284)	14.83 (2.92)	28%
63.12 (47.07)	2310	5.03 (19.06)	0.551 (0.335)	12.54 (2.47)	Barometer
31.94 (23.82)	2338	3.78 (14.29)	0.817 (0.497)	8.46 (1.67)	29.12" Hg (98.61 kPa)
0.51 (0.38)	2363	2.56 (9.69)	34.526 (21.002)	0.20 (0.04)	

Maximum Torque 444 lb.-ft (602 Nm) at 1700 rpm

Maximum Torque Rise 31.4%

Torque Rise at 1000 engine rpm 23%

#### DRAWBAR PERFORMANCE

#### FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
<b>Maximum Power—12th Gear</b>									
122.53 (91.37)	5126 (22.80)	8.96 (14.43)	2199	2.41	0.473 (0.288)	14.62 (2.88)	188 (87)	74 (23)	28.84 (97.66)
<b>75% of Pull at Maximum Power—12th Gear</b>									
94.70 (70.62)	3843 (17.09)	9.24 (14.87)	2254	1.80	0.518 (0.315)	13.33 (2.63)	186 (85)	76 (24)	28.84 (97.66)
<b>50% of Pull at Maximum Power—12th Gear</b>									
64.58 (48.16)	2562 (11.40)	9.45 (15.21)	2291	1.17	0.611 (0.371)	11.32 (2.23)	184 (84)	77 (25)	28.84 (97.66)
<b>75% of Pull at Reduced Engine Speed—13th Gear</b>									
94.72 (70.64)	3845 (17.10)	9.24 (14.87)	1821	1.71	0.476 (0.290)	14.51 (2.86)	186 (86)	76 (24)	28.84 (97.66)
<b>50% of Pull at Reduced Engine Speed—13th Gear</b>									
64.53 (48.12)	2563 (11.40)	9.44 (15.20)	1850	1.17	0.542 (0.330)	12.75 (2.51)	182 (83)	80 (27)	28.84 (97.66)

**Location of Test:** Center for Agricultural Equipment, Lincoln Nebraska 68583-0832, U.S.A.

**Dates of Test:** April-May, 1989

**Manufacturer:** John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

**FUEL OIL and TIME:** Fuel No. 2 Diesel Cetane No. 51.1 Specific gravity converted to 60°/60°F (15°/15°C) 0.8301 Fuel weight 6.912 lbs/gal (0.828 kg/l) Oil SAE 15W40 API service classification CD/SD To motor 4.166 gal (15.768 l) Drained from motor 4.122 gal (15.605 l) Transmission and hydraulic lubricant John Deere HyGard fluid Front axle lubricant John Deere GL-5 Gear Lubricant 85W-140 Total time engine was operated 30.0 hours.

**ENGINE:** Make John Deere Diesel Type six cylinder vertical with turbocharger Serial No. \*RG6076T102604\* Crankshaft lengthwise Rated engine speed 2200 Bore and stroke (as specified) 4.56" × 4.75" (115.8 mm × 120.7 mm) Compression ratio 16.0 to 1 Displacement 466 cu in (7634 ml) Starting system 12 volt Lubrication pressure Air cleaner two paper elements Oil filter one full flow cartridge Oil cooler engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil Fuel filter one paper cartridge and prefilter Muffler vertical Cooling medium temperature control 2 thermostats and variable speed fan.

**ENGINE OPERATING PARAMETERS:** Fuel rate 56.3-61.5 lb/hr (25.6-27.9 kg/hr) High idle 2350-2400 rpm Turbo boost nominal 14-17 psi (97-117 kPa) as measured 14.5 psi (100 kPa).

**CHASSIS:** Type front wheel assist Serial No. \*RW4455P001020\* Tread width rear 62.0" (1574 mm) to 116.0" (2950 mm) front 60.6" (1538 mm) to 88.0" (2235 mm) Wheel base 105.3" (2675 mm) Hydraulic control system direct engine drive Transmission selective gear fixed ratio with full range operator controlled powershift Nominal travel speeds mph (km/h) first 1.45 (2.34) second 2.08 (3.35) third 2.51 (4.05) fourth 3.16 (5.08) fifth 3.64 (5.86) sixth 4.13 (6.65) seventh 4.76 (7.66) eighth 5.47 (8.80) ninth 6.30 (10.13) tenth 7.15 (11.50) eleventh 8.23 (13.25) twelfth 9.21 (14.82) thirteenth 11.40 (18.35) fourteenth 15.94 (25.66) fifteenth 19.73 (31.75) reverse 2.01 (3.24), 2.88 (4.64), 4.37 (7.04), 6.59 (10.60) Clutch multiple wet disc hydraulically power actuated by foot pedal Brakes multiple wet disc hydraulically power actuated by two foot pedals which can be locked together Steering hydrostatic Power take-off 540 rpm at 2201 engine rpm and 1002 rpm at 2200 engine rpm Unladen tractor mass 15275 lb (6928 kg).

# **DRAWBAR PERFORMANCE AT 1850 RPM** **MAXIMUM POWER IN SELECTED GEARS**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
5th Gear									
113.25 (84.45)	14200 (63.16)	2.99 (4.81)	2126	14.74	0.506 (0.308)	13.66 (2.69)	185 (85)	48 (9)	29.12 (98.61)
6th Gear									
121.57 (90.66)	12794 (56.91)	3.56 (5.73)	2083	8.53	0.467 (0.284)	14.79 (2.91)	185 (85)	48 (9)	29.12 (98.61)
7th Gear									
125.11 (93.29)	11864 (52.77)	3.95 (6.36)	1975	7.14	0.449 (0.273)	15.40 (3.03)	185 (85)	48 (9)	29.12 (98.61)
8th Gear									
121.45 (90.56)	10553 (46.94)	4.32 (6.95)	1848	5.69	0.458 (0.278)	15.10 (2.97)	185 (85)	48 (9)	29.12 (98.61)
9th Gear									
122.81 (91.58)	9134 (40.63)	5.04 (8.11)	1852	4.62	0.451 (0.274)	15.33 (3.02)	185 (85)	48 (9)	29.12 (98.61)
10th Gear									
123.62 (92.19)	8037 (35.75)	5.77 (9.28)	1852	3.87	0.446 (0.271)	15.50 (3.05)	184 (84)	48 (9)	29.12 (98.61)
11th Gear									
122.93 (91.67)	6897 (30.68)	6.68 (10.76)	1852	3.27	0.451 (0.274)	15.34 (3.02)	184 (84)	48 (9)	29.12 (98.61)
12th Gear									
126.69 (94.47)	6338 (28.19)	7.50 (12.06)	1851	2.93	0.437 (0.266)	15.80 (3.11)	184 (84)	48 (9)	29.12 (98.61)
13th Gear									
124.35 (92.73)	4998 (22.23)	9.33 (15.02)	1849	2.32	0.448 (0.272)	15.44 (3.04)	184 (84)	48 (9)	29.12 (98.61)

# **DRAWBAR PERFORMANCE AT 1850 RPM** **MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
100.17 (74.69)	17366 (77.25)	2.16 (3.48)	2233	14.73	0.548 (0.334)	12.60 (2.48)	186 (86)	72 (22)	28.57 (96.75)
4th Gear									
118.19 (88.14)	15455 (68.75)	2.87 (4.62)	2176	7.70	0.488 (0.297)	14.16 (2.79)	186 (85)	71 (22)	28.57 (96.75)
5th Gear									
122.40 (91.28)	15064 (67.01)	3.05 (4.90)	2001	7.15	0.464 (0.282)	14.90 (2.93)	189 (87)	72 (22)	28.72 (97.26)
6th Gear									
123.94 (92.42)	14374 (63.94)	3.23 (5.20)	1851	6.28	0.453 (0.276)	15.25 (3.00)	187 (86)	68 (20)	28.72 (97.26)
7th Gear									
126.10 (94.03)	12474 (55.49)	3.79 (6.10)	1854	4.90	0.443 (0.269)	15.61 (3.07)	187 (86)	65 (18)	28.72 (97.26)
8th Gear									
121.04 (90.26)	10335 (45.97)	4.39 (7.07)	1851	3.98	0.462 (0.281)	14.97 (2.95)	190 (88)	74 (23)	28.72 (97.26)
9th Gear									
121.52 (90.62)	8959 (39.85)	5.09 (8.19)	1851	3.30	0.462 (0.281)	14.96 (2.95)	190 (88)	76 (24)	28.72 (97.26)
10th Gear									
122.44 (91.31)	7918 (35.22)	5.80 (9.33)	1852	2.96	0.455 (0.277)	15.19 (2.99)	190 (88)	76 (24)	28.72 (97.26)
11th Gear									
120.82 (90.10)	6753 (30.04)	6.71 (10.80)	1850	2.62	0.460 (0.280)	15.02 (2.96)	190 (88)	79 (26)	28.73 (97.29)
12th Gear									
124.94 (93.17)	6219 (27.66)	7.53 (12.13)	1854	2.36	0.449 (0.273)	15.40 (3.03)	189 (87)	80 (27)	28.73 (97.29)
13th Gear									
120.97 (90.21)	4846 (21.55)	9.36 (15.07)	1852	1.83	0.458 (0.278)	15.10 (2.98)	189 (87)	85 (29)	28.73 (97.29)

**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 return was maintained at 129° F (54° C). This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. This tractor did not meet manufacturers 3 point lift capacity claim of 6550 lb (2971 kg) or 8470 lb (3842 kg) with lift assist cylinder. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1619**, Summary 057, December 22, 1989.

LOUIS I. LEVITICUS  
Engineer-in-Charge

K. VON BARGEN  
R. D. GRISSO  
G. J. HOFFMAN  
Board of Tractor Test Engineers

# **DRAWBAR PERFORMANCE AT 2200 RPM** **MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
100.83 (75.19)	17446 (77.60)	2.17 (3.49)	2233	14.53	0.548 (0.333)	12.61 (2.48)	186 (86)	71 (22)	28.57 (96.75)
4th Gear									
118.09 (88.06)	15218 (67.69)	2.91 (4.68)	2198	7.31	0.488 (0.297)	14.17 (2.79)	186 (85)	71 (22)	28.57 (96.75)
5th Gear									
121.02 (90.24)	13287 (59.10)	3.42 (5.50)	2200	5.47	0.478 (0.291)	14.45 (2.85)	187 (86)	70 (21)	28.72 (97.26)
6th Gear									
122.79 (91.56)	11759 (52.31)	3.92 (6.30)	2200	4.56	0.471 (0.287)	14.66 (2.89)	187 (86)	66 (19)	28.72 (97.26)
7th Gear									
123.72 (92.26)	10198 (45.36)	4.55 (7.32)	2200	3.81	0.468 (0.285)	14.77 (2.91)	186 (85)	65 (18)	28.72 (97.26)
8th Gear									
118.59 (88.43)	8454 (37.60)	5.26 (8.47)	2200	3.13	0.490 (0.298)	14.12 (2.78)	189 (87)	76 (24)	28.72 (97.26)
9th Gear									
118.44 (88.32)	7299 (32.47)	6.09 (9.79)	2200	2.70	0.488 (0.297)	14.15 (2.79)	190 (88)	76 (24)	28.72 (97.26)
10th Gear									
118.12 (88.09)	6394 (28.44)	6.93 (11.15)	2200	2.44	0.486 (0.296)	14.22 (2.80)	189 (87)	76 (24)	28.72 (97.26)
11th Gear									
116.75 (87.06)	5466 (24.31)	8.01 (12.89)	2198	2.09	0.489 (0.297)	14.13 (2.78)	190 (88)	79 (26)	28.73 (97.29)
12th Gear									
119.65 (89.23)	5005 (22.26)	8.97 (14.43)	2196	1.83	0.479 (0.291)	14.44 (2.84)	190 (88)	82 (28)	28.73 (97.29)

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear closest to 4.7 mph (7.5 km/h)—7th Gear	74.5
Maximum sound level	76.5
Transport speed—no load—15th Gear	77.0
Bystander in 15th Gear	87.0

## **LUGGING ABILITY IN 10th GEAR**

Crankshaft Speed rpm	2200	1978	1755	1542	1321	1101
Pull—lbs (kN)	6394 (28.44)	7221 (32.12)	8302 (36.93)	8501 (37.81)	8502 (37.82)	8180 (36.39)
Increase in Pull %	0	13	30	33	33	28
Power—Hp (kW)	118.12 (88.09)	119.60 (89.19)	121.54 (90.63)	109.25 (81.47)	93.60 (69.80)	75.07 (55.98)
Speed—Mph (km/h)	6.93 (11.15)	6.21 (10.00)	5.49 (8.84)	4.82 (7.76)	4.13 (6.64)	3.44 (5.54)
Slip %	2.44	2.62	3.13	3.13	3.13	3.13

## **THREE POINT HITCH PERFORMANCE (SAE Static Test)**

Observed Maximum Pressure psi. (bar)	2530 (174)				
Location	remote outlet				
Hydraulic oil temperature °F(°C)	144 (62)				
Location	transmission sump				
Category	II				
Quick attach	No				
Hitch point distance to ground level in. (mm)	8.7 (221)	15.7 (399)	22.4 (569)	30.4 (772)	37.4 (950)
Lift force on frame lb. " " " " " " (kN)	7550 (33.6)	7482 (33.3)	7199 (32.0)	6526 (29.0)	6175 (27.5)
with lift assist cylinder					
Hitch point distance to ground level in. (mm)	9.0 (229)	16.0 (406)	22.3 (566)	30.4 (772)	37.4 (950)
Lift force on frame lb. " " " " " " (kN)	9833 (43.7)	9872 (43.9)	9540 (42.4)	8633 (38.4)	8077 (35.9)

TIRES AND WEIGHT		With Ballast	Without Ballast
<b>Rear Tires</b> —No., size, ply & psi (kPa)		Four 18.4R42; **, 12 (85)	Two 18.4R42; **, 16 (110)
<b>Ballast</b> —Duals (total)		1710 lb (776 kg)	None
—Cast Iron (total)		1000 lb (454 kg)	None
<b>Front Tires</b> —No., size, ply & psi (kPa)		Two 14.9R30; ***, 30 (205)	Two 14.9R30; ***, 30 (205)
<b>Ballast</b> —Test Equip (total)		115 lb (52 kg)	None
—Cast Iron (total)		100 lb (45 kg)	None
<b>Height of Drawbar</b>		18.5 in (470 mm)	18.5 in (470 mm)
<b>Static Weight</b> —Rear		12630 lb (5729 kg)	9825 lb (4456 kg)
—Front		5570 lb (2526 kg)	5450 lb (2472 kg)
—Total		18200 lb (8255 kg)	15275 lb (6928 kg)

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

CATEGORY: II

Quick Attach: None

Maximum Force Exerted Through Whole Range:

5504 lbs (24.5 kN)

\*7281 lbs (32.4 kN)

i) Opening pressure of relief valve:

NA

Sustained pressure with pump stalled:

2530 psi (174 Bar)

ii) Pump delivery rate at minimum pressure:

27.0 GPM (102.2 l/min)

iii) Pump delivery rate at maximum

hydraulic power:

25.7 GPM (97.3 l/min)

Delivery pressure:

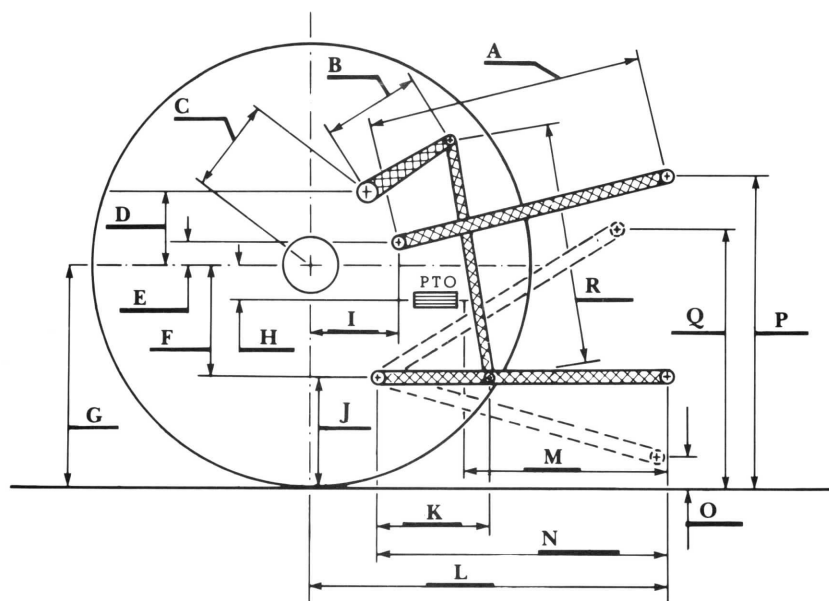
2100 psi (145 Bar)

Power:

31.5 Hp (23.5 kW)

\*with lift assist cylinder

\*with lift assist cylinder



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	26.6	676
B	11.5	292
C	11.3	287
D	10.9	278
E	5.6	143
F	10.2	259
G	35.1	892
H	6.5	165
I	14.3	362
J	24.9	633
K	23.1	587
L	41.6	1056
M	22.0	558
N	37.1	942
O	10.3	262
P	45.0	1143
Q	37.5	953
R	32.8	833



John Deere 4455 Powershift Diesel

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