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2017

Tractor Test 2172: John Deere 8400R e23

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 2172-SUMMARY 1086

JOHN DEERE 8400R DIESEL

e23 TRANSMISSION

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Diesel Consumption		D.E.F. Consumption		Mean Atmospheric Conditions
		Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.l/l)	Gal/hr (l/h)	
MAXIMUM POWER AND FUEL CONSUMPTION						
Rated Engine Speed—(PTO speed—1053 rpm)						
338.29 (252.26)	2101	17.42 (65.93)	0.361 (0.219)	19.42 (3.83)	0.44 (1.67)	Fuel used during active exhaust regeneration-0.65 gal (2.46 l) (see note 1, p.2)
Standard Power Take-off Speed(1000 rpm)						
362.26 (270.14)	1995	18.36 (69.51)	0.355 (0.216)	19.73 (3.89)	0.55 (2.08)	
Maximum Power (1 hour)						
367.80 (274.27)	1800	18.30 (69.29)	0.349 (0.212)	20.09 (3.96)	0.60 (2.27)	

VARYING POWER AND FUEL CONSUMPTION

338.29 (252.26)	2101	17.42 (65.93)	0.361 (0.219)	19.42 (3.83)	0.44 (1.67)	Air temperature
295.19 (220.12)	2156	15.39 (58.27)	0.365 (0.222)	19.18 (3.78)	0.36 (1.36)	72°F (22°C)
222.42 (165.86)	2166	12.16 (46.02)	0.383 (0.233)	18.30 (3.60)	0.28 (1.07)	Relative humidity
149.14 (111.21)	2178	9.12 (34.54)	0.428 (0.261)	16.34 (3.22)	0.23 (0.87)	30%
74.69 (55.69)	2187	6.45 (24.40)	0.604 (0.368)	11.59 (2.28)	0.12 (0.46)	Barometer
1.30 (0.97)	2199	4.55 (17.23)	24.588 (14.957)	0.28 (0.06)	0.10 (0.37)	28.70" Hg (97.17 kPa)

Maximum Torque - 1179 lb.-ft. (1599 Nm) at 1499 rpm
 Maximum Torque Rise - 39.5%
 Torque rise at 1680 engine rpm - 34%
 Power increase at 1800 engine rpm - 8.7%

DRAWBAR PERFORMANCE

UNBALLASTED - FRONT DRIVE ENGAGED

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.l/l)	D.E.F Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing dry bulb	Barom. inch Hg (kPa)	
Power at Rated Engine Speed—10th Gear-Manual mode										
320.19 (238.77)	23052 (102.54)	5.21 (8.38)	2099	5.0	0.410 (0.249)	17.08 (3.36)	0.010 (0.006)	207 (97)	59 (15)	28.60 (96.85)
75% of Pull at Rated Engine Speed—10th Gear-Manual mode										
251.97 (187.89)	17259 (76.77)	5.48 (8.81)	2160	2.9	0.413 (0.251)	16.94 (3.34)	0.013 (0.008)	195 (91)	61 (16)	28.60 (96.85)
50% of Pull at Rated Engine Speed—10th Gear-Manual mode										
171.25 (127.70)	11492 (51.12)	5.59 (9.00)	2173	1.5	0.441 (0.268)	15.87 (3.13)	0.014 (0.008)	188 (87)	60 (16)	28.59 (96.82)
75% of Pull at Reduced Engine Speed—5.7 mph (9.2 km/h) Auto mode										
252.04 (187.94)	17349 (77.17)	5.45 (8.77)	1378	2.9	0.380 (0.231)	18.42 (3.63)	0.015 (0.009)	208 (98)	61 (16)	28.59 (96.82)
50% of Pull at Reduced Engine Speed—5.8 mph (9.4 km/h) Auto mode										
171.43 (127.84)	11396 (50.69)	5.64 (9.08)	1224	1.4	0.391 (0.238)	17.92 (3.53)	0.018 (0.011)	194 (90)	60 (16)	28.61 (96.88)

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

Dates of tests: April 4 - 21, 2017

Manufacturer: John Deere Tractor Works, 3500
East Donald St., P.O. Box 270, Waterloo Ia,
50704-0270

CONSUMABLE Fluids, OIL and TIME: Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8411 **Fuel weight** 7.003 lbs/gal (0.839 kg/l) **Diesel Exhaust Fluid (DEF)** 32% aqueous urea solution **DEF weight** 9.071 lbs/gal (1.087 kg/l) **Oil** SAE 10W-30 **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:** 30.0 hours

ENGINE: Make John Deere **Diesel Type** six cylinder vertical with two turbochargers, air to air aftercooler and D.E.F (diesel exhaust fluid) exhaust treatment **Serial No.** *RG6090U034416* **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** 4.661" x 5.354" (118.4 mm x 136.0 mm) **Compression ratio** 16.0 to 1 **Displacement** 548 cu in (8984 ml) **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **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 element and water separator **Fuel cooler** radiator for pump return fuel **Exhaust** DOC (diesel oxidation catalyst), SCR (selective catalyst reduction) and regenerative DPF (diesel particulate filter) integrated within a vertical muffler **Cooling medium temperature control** thermostat and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: Stationary PTO operations (370 engine hp) 116.8 - 126.5 lb/h (53.0 - 57.4 kg/h) Drawbar operations (400 engine hp) 126.3 - 136.7 (57.3 - 62.0 kg/h) **High idle:** 2190-2210 rpm **Turbo boost:** nominal 30.4-34.8 psi (210-240 kPa) as measured 32.6 psi (225 kPa)

CHASSIS: Type front wheel assist with duals **Serial No.** *1RW8400RLGS115196* **Tread width** rear 60.0" (1524 mm) to 132.6" (3368 mm) front 64.0" (1625 mm) to 144.0" (3660 mm) **Wheelbase** 121.3" (3080 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range power shift **Nominal travel speeds mph (km/h)** first 1.49 (2.40) second 1.73 (2.78) third 2.00 (3.22) fourth 2.32 (3.74) fifth 2.69 (4.33) sixth 3.12 (5.03) seventh 3.59 (5.77) eighth 4.16 (6.70) ninth 4.82 (7.75) tenth 5.58 (8.98) eleventh 6.47 (10.42) twelfth 7.49 (12.06)

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED

MANUAL MODE - 2100 ENGINE RPM
DRAWBAR POWER AT SELECTED TRAVEL SPEED SETTINGS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	D.E.F Consumption lb/hp.hr (kg/kW.h)	Temp.°F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)	
					8th Gear					
283.66 (211.53)	29545 (131.42)	3.60 (5.79)	2146	13.4	0.449 (0.273)	15.61 (3.07)	0.012 (0.008)	200 (93)	58 (14)	28.66 (97.05)
					9th Gear					
311.61 (232.37)	26934 (119.81)	4.34 (6.98)	2099	8.3	0.422 (0.257)	16.59 (3.27)	0.010 (0.006)	203 (95)	60 (15)	28.59 (96.82)
					10th Gear					
320.19 (238.77)	23052 (102.54)	5.21 (8.38)	2099	5.0	0.410 (0.249)	17.08 (3.36)	0.010 (0.006)	207 (97)	59 (15)	28.60 (96.85)
					11th Gear					
325.71 (242.88)	19891 (88.48)	6.14 (9.88)	2099	3.7	0.403 (0.245)	17.39 (3.43)	0.010 (0.006)	201 (94)	56 (14)	28.61 (96.88)
					12th Gear					
327.38 (244.12)	17153 (76.30)	7.16 (11.52)	2099	2.7	0.403 (0.245)	17.38 (3.42)	0.010 (0.006)	212 (100)	55 (13)	28.62 (96.92)
					13th Gear					
326.16 (243.21)	14594 (64.92)	8.38 (13.49)	2102	2.1	0.403 (0.245)	17.37 (3.42)	0.011 (0.006)	212 (100)	57 (14)	28.64 (96.99)

thirteenth 8.70 (14.00) fourteenth 9.99 (16.08)
fifteenth 11.60 (18.67) sixteenth 13.22 (21.27)
seventeenth 15.35 (24.70) eighteenth 17.78 (28.61)
nineteenth 20.64 (33.22) twentieth 23.89 (38.44)
twenty-first 26.10 (42.00) twenty-second 26.10
(42.00) twenty-third 26.10 (42.00) electronically
limited reverse 1.79 (2.88), 2.41 (3.88), 3.24 (5.21),
4.32 (6.95), 4.99 (8.03), 6.71 (10.80), 9.02 (14.51),
12.02 (19.35), 15.91 (25.60), 18.64 (30.00), 18.64
(30.00), 18.64 (30.00) electronically limited **Clutch**
wet multiple disc hydraulically actuated by foot
pedal **Brakes** wet multiple disc hydraulically
operated by two foot pedals that can be locked
together **Steering** hydrostatic **Power take-off** 1000
rpm at 1995 engine rpm **Unladen tractor mass**
29620 lb (13435 kg)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

NOTE 1: The manufacturer declares that the average time between active regenerations is 50 hours.

NOTE 2: In stationary PTO operation, this model operates in a derated power mode.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. This tractor fell 0.9% short of meeting the manufacturer's remote hydraulic flow claim of 85 GPM (321 l/min) with the optional dual pumps combined. The performance figures on this summary were taken from a test conducted under the OECD Code 2 test procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **2172**, Nebraska Summary 1086, June 12, 2017.

Roger M. Hoy
Director

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

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 9th gear	67.4	67.3
Transport speed-no load- 20th gear		69.3
Bystander in 20th gear		85.1

TIRES, BALLAST AND WEIGHT	With Ballast	Without Ballast
Rear Tires - No., size, ply & psi(kPa)	Six 480/80R50;***;12(85)	Four 480/80R50;***;12(85)
Ballast - Triples (total)	2420 lb (1098 kg)	None
- Cast Iron (total)	5905 lb (2678 kg)	None
Front Tires - No., size, ply & psi(kPa)	Four 420/85R34;***;18(125)	Four 420/85R34;***;15(105)
Ballast - Cast Iron (total)	2600 lb (1179 kg)	None
- Liquid (total)	None	None
Height of Drawbar	21.0 in (535 mm)	21.5 in (545 mm)
Static Weight with operator - Rear	23680 lb (10741 kg)	16420 lb (7448 kg)
- Front	17040 lb (7729 kg)	13375 lb (6067 kg)
- Total	40720 lb (18470 kg)	29795 lb (13515 kg)

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED - AUTO MODE
(Loads based on 2100 engine rpm manual mode performance runs)

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)	D.E.F Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
4.8 mph (7.8 km/h)										
311.86 (232.55)	26902 (119.67)	4.35 (6.99)	1820	8.8	0.413 (0.251)	16.94 (3.34)	0.014 (0.009)	216 (102)	59 (15)	28.61 (96.88)
5.6 mph (9.0 km/hr)										
319.16 (238.00)	22937 (102.03)	5.22 (8.40)	1810	4.9	0.396 (0.241)	17.66 (3.48)	0.014 (0.009)	216 (102)	59 (15)	28.61 (96.88)
6.5 mph (10.4 km/h)										
325.00 (242.35)	19936 (88.68)	6.12 (9.84)	1807	3.6	0.389 (0.236)	18.02 (3.55)	0.013 (0.008)	210 (99)	56 (13)	28.64 (96.99)
7.5 mph (12.0 km/h)										
327.36 (244.11)	17247 (76.72)	7.12 (11.46)	1797	2.9	0.386 (0.235)	18.15 (3.58)	0.013 (0.008)	208 (98)	56 (13)	28.63 (96.95)
8.7 mph (14.0 km/h)										
326.64 (243.58)	14670 (65.25)	8.35 (13.44)	1824	2.2	0.387 (0.236)	18.07 (3.56)	0.013 (0.008)	212 (100)	57 (14)	28.63 (96.95)

**DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED
MANUAL MODE - 1850 ENGINE RPM**

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)	D.E.F Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
					8th Gear					
286.95 (213.98)	29550 (131.45)	3.64 (5.86)	2145	12.6	0.437 (0.266)	16.02 (3.16)	0.012 (0.007)	197 (91)	57 (14)	28.68 (97.12)
					9th Gear					
316.55 (236.05)	28147 (125.20)	4.22 (6.79)	2065	9.5	0.424 (0.258)	16.53 (3.26)	0.011 (0.006)	212 (100)	61 (16)	28.67 (97.08)
					10th Gear					
336.17 (250.68)	26305 (117.01)	4.80 (7.72)	1975	7.1	0.409 (0.249)	17.11 (3.37)	0.011 (0.007)	217 (103)	61 (16)	28.67 (97.08)
					11th Gear					
349.40 (260.55)	24740 (110.05)	5.30 (8.53)	1850	5.6	0.396 (0.241)	17.70 (3.49)	0.014 (0.008)	217 (103)	53 (12)	28.66 (97.05)
					12th Gear					
354.27 (264.18)	21340 (94.93)	6.23 (10.02)	1850	4.2	0.390 (0.237)	17.94 (3.53)	0.014 (0.008)	217 (103)	53 (12)	28.66 (97.05)
					13th Gear					
356.67 (265.97)	18341 (81.58)	7.29 (11.73)	1849	3.2	0.388 (0.236)	18.07 (3.56)	0.014 (0.009)	217 (103)	54 (12)	28.65 (97.02)
					14th Gear					
355.00 (264.72)	15765 (70.12)	8.45 (13.59)	1852	2.5	0.392 (0.239)	17.85 (3.52)	0.014 (0.008)	217 (103)	56 (13)	28.67 (97.09)

Lugging ability in 12th gear

Crankshaft speed rpm	2100	2001	1950	1850	1700	1500	1300	1101
Pull-lbs (kN)	17232 (76.65)	19356 (86.10)	20076 (89.30)	21381 (95.11)	22810 (101.46)	23822 (105.97)	22529 (100.21)	20872 (92.84)
Increase in pull %	0	12	17	24	32	38	31	21
Power-Hp (kW)	329.51 (245.72)	350.84 (261.62)	353.74 (263.78)	355.73 (265.26)	346.61 (258.46)	317.68 (236.89)	261.65 (195.11)	206.60 (154.06)
Speed-mpH (km/h)	7.17 (11.54)	6.80 (10.94)	6.61 (10.64)	6.24 (10.04)	5.70 (9.17)	5.00 (8.05)	4.36 (7.02)	3.72 (5.98)
Slip %		2.8	3.2	3.5	3.9	4.5	5.0	4.6

**DRAWBAR PERFORMANCE
BALLASTED - FRONT DRIVE ENGAGED
MANUAL MODE - 1850 ENGINE RPM**

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)	D.E.F Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
					6th Gear					
293.44 (218.81)	41087 (182.76)	2.68 (4.31)	2112	13.7	0.444 (0.270)	15.77 (3.11)	0.012 (0.007)	195 (90)	54 (12)	28.86 (97.73)
					7th Gear					
320.55 (239.03)	38498 (171.25)	3.13 (5.03)	2040	9.3	0.424 (0.258)	16.53 (3.26)	0.009 (0.006)	204 (96)	54 (12)	28.87 (97.77)
					8th Gear					
338.78 (252.62)	36327 (161.59)	3.50 (5.63)	1934	7.6	0.411 (0.250)	17.05 (3.36)	0.011 (0.007)	217 (103)	54 (12)	28.87 (97.77)
					9th Gear					
346.42 (258.32)	33016 (146.86)	3.94 (6.33)	1850	6.1	0.399 (0.243)	17.55 (3.46)	0.013 (0.008)	217 (103)	55 (13)	28.87 (97.77)
					10th Gear					
348.73 (260.04)	28191 (125.40)	4.64 (7.47)	1849	4.4	0.396 (0.241)	17.68 (3.48)	0.013 (0.008)	218 (103)	53 (12)	28.86 (97.73)
					11th Gear					
351.04 (261.77)	24214 (107.71)	5.44 (8.75)	1850	3.5	0.394 (0.240)	17.78 (3.50)	0.013 (0.008)	219 (104)	52 (11)	28.84 (97.66)
					12th Gear					
355.88 (265.38)	21106 (93.88)	6.32 (10.17)	1851	3.0	0.389 (0.237)	17.99 (3.54)	0.012 (0.007)	217 (103)	52 (11)	28.84 (97.66)
					13th Gear					
354.61 (264.43)	18031 (80.20)	7.38 (11.87)	1851	2.6	0.390 (0.237)	17.96 (3.54)	0.013 (0.008)	218 (103)	52 (11)	28.85 (97.70)
					14th Gear					
352.44 (262.81)	15547 (69.15)	8.50 (13.68)	1850	2.2	0.394 (0.240)	17.78 (3.50)	0.012 (0.007)	217 (103)	52 (11)	28.85 (97.70)

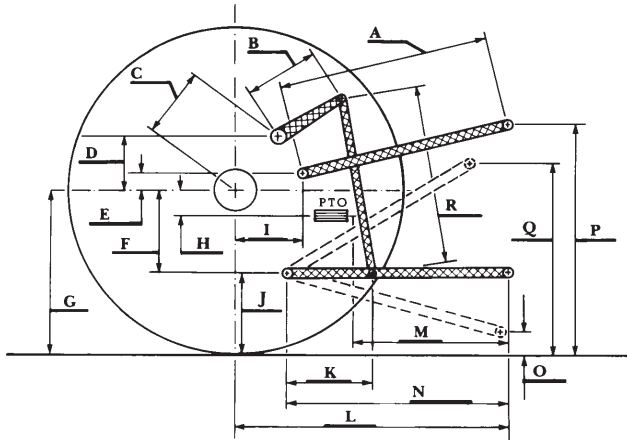
HYDRAULIC PERFORMANCE

CATEGORY: IVN
 Quick Attach: Yes
 OECD Static test

	Lift cylinders	
Maximum force exerted through whole range:	20254 lbs (90.1 kN) 2x115 mm	15229 lbs (67.7 kN) 2x100 mm
	85 cc pump 85 cc and 35cc pumps combined	
i) Sustained pressure at compensator cutoff:	2899 psi (200 bar)	2941 psi (203 bar)
	three outlet sets combined	
ii) Pump delivery rate at minimum pressure and rated engine speed:	60.2 GPM(228.0l/min)	84.2 GPM(318.7l/min)
iii) Pump delivery rate at maximum hydraulic power:	60.5 GPM(228.9l/min)	80.0 GPM(302.9l/min)
Delivery pressure:	2259 psi (156 bar)	2114 psi (146 bar)
Power:	79.7 HP (59.4 kW)	98.7 HP (73.6 kW)
	single outlet set	
ii) Pump delivery rate at minimum pressure and rated engine speed:	1/2" couplers 36.4 GPM(137.9l/min)	3/4" couplers 42.9 GPM(162.5 l/min)
iii) Pump delivery rate at maximum hydraulic power:	34.6 GPM(131.2l/min)	41.5 GPM(157.2 l/min)
Delivery pressure:	2266 psi (156 bar)	2301 psi (159 bar)
Power:	45.8 HP (34.2 kW)	55.8 HP (41.6 kW)

	HITCH DIMENSIONS AS TESTED—NO LOAD	
	inch	mm
A	28.5	725
B	20.5	520
C	20.9	532
D	18.9	480
E	12.0	304
F	14.4	365
G	38.2	970
H	9.1	230
I	23.6	599
J	23.8	605
K	28.7	730
L	52.8	1340
*L'	58.7	1490
M	25.9	657
N	40.1	1019
O	9.1	230
P	50.1	1272
Q	41.5	1055
R	45.7	1160

*L' to Quick Attach ends



JOHN DEERE 8400R DIESEL