

# NEBRASKA OECD TRACTOR TEST 2091-SUMMARY 940

## JOHN DEERE 7290R DIESEL

### e23 TRANSMISSION

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

**Dates of tests:** June 20-30, 2014

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

#### 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.h/l)	Gal/hr (l/h)	
<b>MAXIMUM POWER AND FUEL CONSUMPTION</b>						
<b>Rated Engine Speed—(PTO speed—1077 rpm)</b>						
249.96 (186.39)	2100	13.60 (51.49)	0.382 (0.232)	18.38 (3.62)	0.24 (0.91)	Fuel used during active exhaust regeneration-0.85 gal (3.20 l) (see note 1, p.2)
<b>Standard Power Take-off Speed (1000 rpm)</b>						
278.29 (207.52)	1950	14.69 (55.62)	0.371 (0.225)	18.94 (3.73)	0.27 (1.02)	
<b>Maximum Power (1 hour)</b>						
282.68 (210.79)	1751	14.66 (55.49)	0.364 (0.221)	19.28 (3.80)	0.27 (1.00)	

#### VARYING POWER AND FUEL CONSUMPTION

249.96 (186.39)	2100	13.60 (51.49)	0.382 (0.232)	18.38 (3.62)	0.24 (0.91)	Air temperature
217.73 (162.36)	2154	12.15 (46.01)	0.392 (0.238)	17.91 (3.53)	0.21 (0.79)	74°F (23°C)
164.19 (122.44)	2164	9.59 (36.30)	0.410 (0.249)	17.12 (3.37)	0.18 (0.67)	Relative humidity
109.88 (81.94)	2174	7.35 (27.80)	0.469 (0.285)	14.96 (2.95)	0.14 (0.54)	71%
55.31 (41.24)	2184	5.27 (19.97)	0.669 (0.407)	10.49 (2.07)	0.09 (0.30)	Barometer
2.78 (2.07)	2196	3.28 (12.43)	8.291 (5.043)	0.85 (0.17)	0.09 (0.36)	28.75" Hg (97.36 kPa)

Maximum torque - 904 lb.-ft. (1226 Nm) at 1550 rpm

Maximum torque rise - 44.7%

Torque rise at 1680 engine rpm - 40%

Power increase at 1751 engine rpm - 13.1%

#### 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.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
<b>Maximum Power—11th Gear - Manual mode</b>									
223.85 (166.92)	14624 (65.05)	5.74 (9.24)	2100	2.8	0.424 (0.258)	16.54 (3.26)	219 (104)	69 (20)	28.64 (96.99)
<b>75% of Pull at Maximum Power—11th Gear - Manual mode</b>									
173.73 (129.55)	10956 (48.73)	5.95 (9.58)	2158	2.1	0.443 (0.269)	15.85 (3.12)	218 (103)	77 (25)	28.68 (97.12)
<b>50% of Pull at Maximum Power—11th Gear - Manual mode</b>									
117.53 (87.64)	7321 (32.56)	6.02 (9.69)	2170	1.4	0.497 (0.302)	14.13 (2.78)	217 (103)	77 (25)	28.68 (97.12)
<b>75% of Pull at Reduced Engine Speed—6.1 mph (9.8 km/h)-Auto mode</b>									
173.68 (129.51)	10927 (48.61)	5.96 (9.59)	1422	2.1	0.403 (0.245)	17.42 (3.43)	218 (103)	77 (25)	28.69 (97.16)
<b>50% of Pull at Reduced Engine Speed—6.1 mph (9.8 km/h)-Auto mode</b>									
117.16 (87.36)	7324 (32.58)	6.00 (9.66)	1231	1.5	0.421 (0.256)	16.67 (3.28)	216 (102)	76 (25)	28.68 (97.12)

**CONSUMABLE Fluids, OIL and TIME: Fuel** No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8429 **Fuel weight** 7.018 lbs/gal (0.841 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:** 23.5 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.** \*RG6090U000635\* **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 prestrainer **Fuel cooler** radiator for pump return fuel **Exhaust** regenerative particulate filter integrated within a vertical muffler **Cooling medium temperature control** thermostat and variable speed fan

**ENGINE OPERATING PARAMETERS: Fuel rate:** 90.3 - 97.9 lb/h (41.0 - 44.4 kg/h) **High idle:** 2150 - 2250 rpm **Turbo boost:** nominal 21.8 - 25.4 psi (155 - 175 kPa) as measured 24.4 psi (168 kPa)

**CHASSIS: Type** front wheel assist with duals **Serial No.** \*1RW7290RCES081498\* **Tread width** rear 60.0" (1524 mm) to 128.9" (3272 mm) front 60.0" (1524 mm) to 88.0" (2235 mm) **Wheelbase** 115.2" (2925 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled power shift **Nominal travel speeds mph (km/h)** first 1.43 (2.30) second 1.65 (2.66) third 1.91 (3.07) fourth 2.20 (3.54) fifth 2.54 (4.08) sixth 2.93 (4.71) seventh 3.35 (5.39) eighth 3.87 (6.22) ninth 4.42 (7.12) tenth 5.11 (8.22) eleventh 5.90 (9.49) twelfth 6.79 (10.92) thirteenth 7.84 (12.61) fourteenth 8.97 (14.44) fifteenth 10.36 (16.68) sixteenth 12.04 (19.37) seventeenth 13.90 (22.37) eighteenth 16.05 (25.83) nineteenth 18.54 (29.84) twentieth 21.33 (34.33) twenty-first 24.64 (39.65) twenty-second 26.10 (42.00) twenty-third 26.10 (42.00) electronically limited

**DRAWBAR PERFORMANCE**  
**UNBALLASTED - FRONT DRIVE ENGAGED**  
**MANUAL MODE - 2100 ENGINE RPM**  
**DRAWBAR 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/kWh)	Temp. °F cool- ing med	Temp. °C Air dry bulb	Barom. inch Hg (kPa)	
7th Gear									
180.81 (134.83)	23099 (102.75)	2.94 (4.73)	2152	14.6	0.490 (0.298)	14.32 (2.82)	218 (103)	66 (19)	28.74 (97.33)
8th Gear									
209.19 (155.99)	22255 (98.99)	3.53 (5.67)	2101	9.0	0.453 (0.276)	15.49 (3.05)	218 (103)	72 (22)	28.74 (97.33)
9th Gear									
218.32 (162.80)	19422 (86.39)	4.22 (6.78)	2100	4.7	0.438 (0.266)	16.04 (3.16)	218 (103)	74 (23)	28.65 (97.02)
10th Gear									
221.34 (165.05)	16813 (74.79)	4.94 (7.95)	2100	3.5	0.430 (0.261)	16.33 (3.22)	219 (104)	72 (22)	28.65 (97.02)
11th Gear									
223.85 (166.92)	14624 (65.05)	5.74 (9.24)	2100	2.8	0.424 (0.258)	16.54 (3.26)	219 (104)	69 (20)	28.64 (96.99)
12th Gear									
223.70 (166.81)	12648 (56.26)	6.63 (10.67)	2099	2.5	0.426 (0.259)	16.49 (3.25)	218 (103)	70 (21)	28.65 (97.02)
13th Gear									
222.31 (165.78)	10844 (48.24)	7.69 (12.38)	2099	2.0	0.428 (0.261)	16.38 (3.23)	219 (104)	74 (23)	28.65 (97.02)
14th Gear									
220.33 (164.30)	9362 (41.64)	8.83 (14.21)	2100	1.7	0.430 (0.262)	16.30 (3.21)	219 (104)	76 (24)	28.66 (97.05)

reverse 1.34 (2.15), 1.78 (2.87), 2.37 (3.81), 3.13 (5.04), 3.58 (5.76), 4.77 (7.68), 6.34 (10.21), 8.39 (13.50), 11.25 (18.11), 15.01 (24.15), 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** 540 rpm at 1958 engine rpm or 1000 rpm at 1950 engine rpm **Unladen tractor mass** 24085 lb (10925 kg)

**REPAIRS AND ADJUSTMENTS:** No repairs or adjustments.

**NOTE 1:** The manufacturer declares that the average time between active regenerations is 50 hours, while operated in Auto Filter Cleaning Mode, at rated speed, full load, under steady state conditions. A 3% power loss was observed during the active regeneration.

**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). This tractor did not meet the manufacturer's remote hydraulic flow claim of 59 GPM (223.3 l/min) with the 85 cc pump. 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. **2091**, Nebraska Summary 940, July 11, 2014.

Roger M. Hoy  
 Director

M.F. Kocher  
 S. Pitla  
 P.J. Jasa  
 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	67.0	66.8
Transport speed - no load - 21st gear		68.8
Bystander in 21st gear		84.4

**TIRES, BALLAST AND WEIGHT**

	With Ballast	Without Ballast
<b>Rear Tires</b> - No., size, ply & psi(kPa)	Four 480/80R46;***;16(110)	Four 480/80R46;***;12(85)
<b>Ballast</b> - Liquid (total)	None	None
- Cast Iron (total)	3910 lb (1774 kg)	None
<b>Front Tires</b> - No., size, ply & psi(kPa)	Two 420/90R30;***;23(160)	Two 420/90R30;***;16(110)
<b>Ballast</b> - Liquid (total)	None	None
- Cast Iron (total)	2430 lb (1102 kg)	None
<b>Height of Drawbar</b>	19.0 in (485 mm)	19.0 in (485 mm)
<b>Static Weight with operator</b> - Rear	19000 lb (8618 kg)	15870 lb (7198 kg)
- Front	11600 lb (5262 kg)	8390 lb (3806 kg)
- Total	30600 lb (13880 kg)	24260 lb (11004 kg)

**DRAWBAR PERFORMANCE**  
**UNBALLASTED - FRONT DRIVE ENGAGED - AUTO MODE**  
**(Loads based on 2100 engine rpm manual mode performance runs)**  
**DRAWBAR POWER AT SELECTED TRAVEL SPEEDS**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3.2 mph (5.2 km/h)									
175.88 (131.15)	22927 (101.98)	2.88 (4.63)	1326	11.1	0.435 (0.265)	16.12 (3.18)	217 (103)	67 (20)	28.74 (97.33)
3.9 mph (6.2 km/h)									
207.55 (154.77)	22293 (99.16)	3.50 (5.62)	1581	9.3	0.425 (0.259)	16.50 (3.25)	218 (103)	74 (23)	28.75 (97.36)
4.5 mph (7.2 km/h)									
218.94 (163.26)	19395 (86.27)	4.23 (6.81)	1589	5.3	0.408 (0.248)	17.20 (3.39)	218 (103)	75 (24)	28.75 (97.36)
5.1 mph (8.2 km/h)									
220.82 (164.66)	16909 (75.21)	4.90 (7.89)	1573	3.8	0.402 (0.244)	17.47 (3.44)	219 (104)	74 (24)	28.76 (97.39)
6.0 mph (9.6 km/h)									
223.48 (166.65)	14509 (64.54)	5.78 (9.30)	1593	3.1	0.400 (0.243)	17.55 (3.46)	219 (104)	75 (24)	28.76 (97.39)
6.8 mph (11.0 km/h)									
223.10 (166.37)	12572 (55.92)	6.66 (10.71)	1596	2.6	0.401 (0.244)	17.51 (3.45)	219 (104)	75 (24)	28.77 (97.43)
8.0 mph (12.8 km/h)									
220.77 (164.63)	10653 (47.39)	7.77 (12.50)	1607	2.1	0.399 (0.242)	17.61 (3.47)	219 (104)	76 (24)	28.76 (97.39)
9.1 mph (14.6 km/h)									
220.20 (164.20)	9251 (41.15)	8.93 (14.37)	1585	1.8	0.407 (0.248)	17.22 (3.39)	219 (104)	76 (24)	28.76 (97.39)

**DRAWBAR PERFORMANCE**  
**UNBALLASTED - FRONT DRIVE ENGAGED - 1750 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)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)	
7th Gear									
180.95 (134.93)	23116 (102.83)	2.94 (4.73)	2152	14.6	0.490 (0.298)	14.31 (2.82)	218 (103)	66 (19)	28.75 (97.36)
8th Gear									
209.93 (156.54)	22302 (99.20)	3.53 (5.68)	2100	8.8	0.454 (0.276)	15.47 (3.05)	218 (103)	70 (21)	28.74 (97.33)
9th Gear									
224.88 (167.69)	21528 (95.76)	3.92 (6.31)	2016	7.8	0.439 (0.267)	16.00 (3.15)	218 (103)	74 (23)	28.75 (97.36)
10th Gear									
243.51 (181.59)	20607 (91.66)	4.43 (7.13)	1934	6.0	0.424 (0.258)	16.53 (3.26)	219 (104)	74 (24)	28.65 (97.02)
11th Gear									
251.00 (187.17)	18527 (82.41)	5.08 (8.18)	1885	4.2	0.412 (0.251)	17.04 (3.36)	219 (104)	69 (20)	28.64 (96.99)
12th Gear									
252.06 (187.96)	17108 (76.10)	5.53 (8.89)	1770	3.6	0.406 (0.247)	17.27 (3.40)	219 (104)	70 (21)	28.65 (97.02)
13th Gear									
252.10 (187.99)	14885 (66.21)	6.35 (10.22)	1750	3.1	0.405 (0.246)	17.32 (3.41)	219 (104)	75 (24)	28.66 (97.05)
14th Gear									
252.35 (188.17)	12960 (57.65)	7.30 (11.75)	1750	2.4	0.404 (0.246)	17.35 (3.42)	219 (104)	75 (24)	28.65 (97.02)
15th Gear									
251.65 (187.66)	11148 (49.59)	8.47 (13.62)	1750	2.0	0.407 (0.248)	17.25 (3.40)	219 (104)	76 (25)	28.66 (97.05)

**DRAWBAR PERFORMANCE**  
**BALLASTED - FRONT DRIVE ENGAGED - 1750 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)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)	
6th Gear									
195.67 (145.91)	28548 (126.99)	2.57 (4.14)	2115	13.0	0.479 (0.291)	14.65 (2.89)	219 (104)	74 (23)	28.52 (96.58)
7th Gear									
215.56 (160.74)	26628 (118.44)	3.04 (4.89)	2063	8.1	0.450 (0.274)	15.60 (3.07)	219 (104)	80 (27)	28.42 (96.24)
8th Gear									
231.30 (172.48)	25318 (112.62)	3.43 (5.52)	1987	6.5	0.435 (0.265)	16.13 (3.18)	219 (104)	81 (27)	28.41 (96.21)
9th Gear									
242.30 (180.68)	23896 (106.29)	3.81 (6.12)	1908	5.6	0.425 (0.259)	16.50 (3.25)	219 (104)	82 (28)	28.39 (96.14)
10th Gear									
246.32 (183.68)	21800 (96.97)	4.24 (6.82)	1819	4.9	0.413 (0.252)	16.97 (3.34)	219 (104)	82 (28)	28.37 (96.07)
11th Gear									
252.27 (188.12)	19899 (88.52)	4.75 (7.64)	1750	4.0	0.407 (0.247)	17.26 (3.40)	219 (104)	78 (26)	28.46 (96.38)
12th Gear									
252.85 (188.55)	17234 (76.66)	5.50 (8.85)	1750	3.1	0.405 (0.246)	17.33 (3.41)	219 (104)	78 (26)	28.46 (96.38)
13th Gear									
252.07 (187.96)	14801 (65.84)	6.39 (10.28)	1750	2.4	0.405 (0.246)	17.34 (3.42)	219 (104)	78 (26)	28.45 (96.34)
14th Gear									
251.63 (187.64)	12872 (57.26)	7.33 (11.80)	1749	2.0	0.405 (0.247)	17.32 (3.41)	219 (104)	78 (26)	28.44 (96.31)
15th Gear									
250.07 (186.47)	11038 (49.10)	8.50 (13.68)	1750	1.6	0.408 (0.248)	17.21 (3.39)	219 (104)	79 (26)	28.43 (96.28)

## HYDRAULIC PERFORMANCE

CATEGORY: III

Quick Attach: Yes

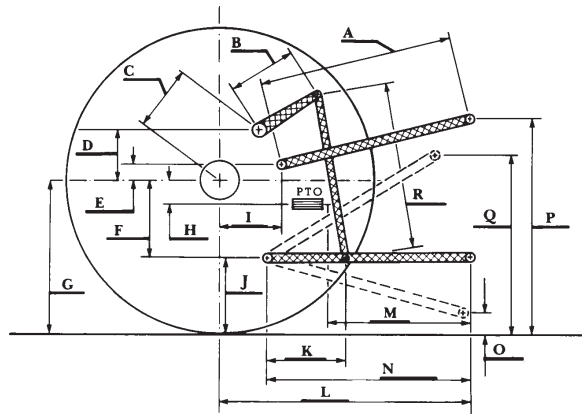
OECD Static test

	<u>lift cylinders</u>	
Maximum force exerted through whole range:	15862 lbs (70.6 kN) (2x100 mm)	18302 lbs (81.4 kN) (1x100 mm & 1x115 mm)
	<u>63 cc pump</u> <u>85 cc pump</u>	
i) Sustained pressure at compensator cutoff:	2970 psi (205 bar)	2931 psi (202 bar)
	<b><u>three outlet sets combined</u></b>	
ii) Pump delivery rate at minimum pressure and rated engine speed:	44.7 GPM (169.2 l/min)	58.3 GPM (220.7 l/min)
iii) Pump delivery rate at maximum hydraulic power:	43.7 GPM (165.3 l/min)	57.5 GPM (217.6 l/min)
Delivery pressure:	2763 psi (190 bar)	2571 psi (177 bar)
Power:	70.4 HP (52.5 kW)	86.2 HP (64.3 kW)
	<b><u>single outlet set</u></b>	
ii) Pump delivery rate at minimum pressure and rated engine speed:	36.8 GPM (139.2 l/min)	36.4 GPM (137.9 l/min)
iii) Pump delivery rate at maximum hydraulic power:	33.8 GPM (127.9 l/min)	35.4 GPM (134.0 l/min)
Delivery pressure:	2363 psi (163 bar)	2244 psi (155 bar)
Power:	46.6 HP (34.7 kW)	46.4 HP (34.6 kW)

## HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	28.0	710
B	20.5	520
C	22.9	581
D	18.9	480
E	7.3	185
F	14.4	365
G	38.8	985
H	3.5	90
I	22.4	570
J	24.4	620
K	29.3	745
L	52.0	1321
*L'	56.0	1423
M	28.0	712
N	43.4	1102
O	9.0	230
P	51.9	1319
Q	39.4	1001
R	44.9	1140

\*L' to Quick Attach ends



### JOHN DEERE 7290R DIESEL

Institute of Agriculture and Natural Resources  
University of Nebraska–Lincoln