January 1994

Test 1681: John Deere 7400 Powrquad Diesel 16-Speed

Nebraska Tractor Test Lab
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NEBRASKA OECD TRACTOR TEST 1681—SUMMARY 153
JOHN DEERE 7400 POWRQUAD DIESEL
16 SPEED

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

Dates of Test: May 12 to June 2, 1994

Manufacturer: John Deere Tractor Works, P.O. Box 270, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 53.9 **Specific gravity converted to 60°/60° F *(15°/15°C)*** 0.8400 **Fuel weight** 6.994 lbs/gal *(0.838 kg/l)* **Oil SAE** 15W-40 **API service classification** SG/CE **To motor** 4.248 gal *(16.080 l)* **Drained from motor** 4.135 gal *(15.651 l)* **Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Front axle lubricant** John Deere GL-5 Gear Lubricant **Total time engine was operated** 19.5 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *TO6068T435241* **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** (as specified) 4.19" × 5.0" *(106.5 mm × 127.0 mm)* **Compression ratio** 17.8 to 1 **Displacement** 414 cu in *(6788 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 inlet fuel **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** two thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 40.1-43.2 lb/h *(18.2-19.6 kg/h)* **High idle:** 2225-2325 rpm **Turbo boost** nominal 8.7-10.2 psi *(60-70 kPa)* as measured 9.0 psi *(62 kPa)*

CHASSIS: Type front wheel assist **Serial No.** *RW7400H001545* **Tread width** rear 60.0" *(1524 mm)* to 100.3" *(2548 mm)* front 60.0" *(1524 mm)* to 88.0" *(2235 mm)* **Wheel base** 103.3" *(2625 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (4) range operator controlled powershift **Nominal travel speeds mph *(km/h)*** first 1.49 *(2.40)* second 1.81 *(2.91)* third 2.16 *(3.47)* fourth 2.64 *(4.25)* fifth 3.17 *(5.10)* sixth 3.83 *(6.16)* seventh 4.57 *(7.35)* eighth 5.04 *(8.11)* ninth 5.59 *(9.00)* tenth 6.09 *(9.80)* eleventh 7.26 *(11.69)* twelfth 8.90 *(14.33)* thirteenth 10.45 *(16.81)* fourteenth 12.63 *(20.32)* fifteenth 15.06 *(24.24)* sixteenth 18.46 *(29.71)*, reverse 1.76 *(2.84)*, 2.13 *(3.43)*, 2.55 *(4.10)*, 3.12 *(5.02)*, 3.74 *(6.02)*, 4.52 *(7.28)*, 5.39 *(8.68)*, 5.95 *(9.58)*, 6.61 *(10.64)*, 7.20 *(11.58)*, 8.59 *(13.82)*, 10.52 *(16.93)* **Clutch** multiple wet disc hydraulically actuated by foot pedal **Brakes** wet multiple disc hydraulically actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 2080 engine rpm and 1000 rpm at 2093 engine rpm **Unladen tractor mass** 12738 lb *(5778 kg)*

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—1003 rpm)					
102.05 *(76.10)*	2099	5.98 *(22.63)*	0.410 *(0.249)*	17.07 *(3.36)*	
Maximum Power (2 hours)					
107.24 *(79.97)*	1900	5.87 *(22.24)*	0.383 *(0.233)*	18.26 *(3.60)*	
VARYING POWER AND FUEL CONSUMPTION					
102.05 *(76.10)*	2099	5.98 *(22.63)*	0.410 *(0.249)*	17.07 *(3.36)*	Air temperature
89.05 *(66.40)*	2156	5.53 *(20.95)*	0.435 *(0.264)*	16.10 *(3.17)*	75°F *(24°C)*
67.63 *(50.43)*	2186	4.72 *(17.86)*	0.488 *(0.297)*	14.33 *(2.82)*	Relative humidity
45.84 *(34.18)*	2210	3.86 *(14.61)*	0.587 *(0.358)*	11.88 *(2.34)*	56%
23.13 *(17.25)*	2230	2.96 *(11.20)*	0.895 *(0.544)*	7.81 *(1.54)*	Barometer
0.82 *(0.61)*	2247	2.02 *(7.63)*	17.246 *(10.491)*	0.41 *(0.08)*	29.08" Hg *(98.46 kPa)*

Maximum Torque 349 lb.-ft. *(474 Nm)* at 1301 rpm
Maximum Torque Rise 36.9%
Torque rise at 1701 engine rpm 27%

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)*
Maximum Power—7th (B3) Gear									
91.22 *(68.02)*	7566 *(33.65)*	4.52 *(7.28)*	2099	4.38	0.458 *(0.279)*	15.27 *(3.01)*	200 *(93)*	70 *(21)*	29.00 *(98.21)*
75% of Pull at Maximum Power—7th (B3) Gear									
71.63 *(53.42)*	5674 *(25.24)*	4.73 *(7.62)*	2176	3.41	0.508 *(0.309)*	13.76 *(2.71)*	196 *(91)*	77 *(25)*	28.95 *(98.04)*
50% of Pull at Maximum Power—7th (B3) Gear									
48.80 *(36.39)*	3781 *(16.82)*	4.84 *(7.79)*	2203	2.51	0.613 *(0.373)*	11.41 *(2.25)*	192 *(89)*	79 *(26)*	28.95 *(98.04)*
75% of Pull at Reduced Engine Speed—11th (C3) Gear									
71.34 *(53.20)*	5675 *(25.24)*	4.71 *(7.59)*	1362	3.41	0.421 *(0.256)*	16.62 *(3.27)*	208 *(98)*	79 *(26)*	28.95 *(98.04)*
50% of Pull at Reduced Engine Speed—11th (C3) Gear									
48.57 *(36.22)*	3805 *(16.92)*	4.79 *(7.70)*	1370	2.43	0.460 *(0.280)*	15.22 *(3.00)*	187 *(86)*	80 *(27)*	28.95 *(98.04)*

DRAWBAR PERFORMANCE
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)
				3rd (A3) Gear					
67.83	12958	1.96	2167	14.79	0.552	12.67	186	66	29.09
(50.58)	(57.64)	(3.16)			(0.336)	(2.50)	(85)	(19)	(98.51)
				4th (A4) Gear					
80.98	12143	2.50	2141	10.24	0.499	14.02	197	70	29.09
(60.39)	(54.01)	(4.03)			(0.304)	(2.76)	(92)	(21)	(98.51)
				5th (B1) Gear					
89.59	11778	2.85	2037	10.30	0.465	15.03	204	74	29.08
(66.81)	(52.39)	(4.59)			(0.283)	(2.96)	(95)	(23)	(98.48)
				6th (B2) Gear					
93.92	10661	3.30	1902	7.70	0.434	16.10	205	77	29.08
(70.04)	(47.42)	(5.32)			(0.264)	(3.17)	(96)	(25)	(98.48)
				7th (B3) Gear					
97.15	8978	4.06	1902	5.33	0.426	16.42	206	71	28.99
(72.45)	(39.94)	(6.53)			(0.259)	(3.24)	(97)	(22)	(98.17)
				8th (C1) Gear					
97.04	8071	4.51	1902	4.54	0.427	16.36	205	67	28.99
(72.37)	(35.90)	(7.26)			(0.260)	(3.22)	(96)	(19)	(98.17)
				9th (B4) Gear					
95.96	7157	5.03	1901	4.22	0.432	16.21	208	74	28.98
(71.56)	(31.84)	(8.09)			(0.263)	(3.19)	(98)	(23)	(98.14)
				10th (C2) Gear					
96.33	6601	5.47	1901	3.82	0.430	16.26	206	68	28.99
(71.83)	(29.36)	(8.81)			(0.262)	(3.20)	(96)	(20)	(98.17)
				11th (C3) Gear					
94.98	5403	6.59	1900	3.09	0.434	16.11	207	75	28.97
(70.82)	(24.03)	(10.61)			(0.264)	(3.17)	(97)	(24)	(98.10)
				12th (C4) Gear					
90.70	4189	8.12	1898	2.76	0.451	15.49	208	76	28.96
(67.64)	(18.63)	(13.07)			(0.275)	(3.05)	(98)	(24)	(98.07)

DRAWBAR PERFORMANCE AT 2100 RPM (Front Drive Engaged)
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)
				4th (A4) Gear					
79.77	12615	2.37	2125	14.34	0.516	13.55	195	68	29.09
(59.49)	(56.11)	(3.82)			(0.314)	(2.67)	(91)	(20)	(98.51)
				5th (B1) Gear					
89.00	11021	3.03	2102	7.78	0.465	15.04	200	73	29.08
(66.37)	(49.02)	(4.87)			(0.283)	(2.96)	(93)	(23)	(98.48)
				6th (B2) Gear					
90.47	91.01	3.73	2100	5.65	0.460	15.21	203	77	29.08
(67.46)	(40.48)	(6.00)			(0.280)	(3.00)	(95)	(25)	(98.48)
				7th (B3) Gear					
91.22	7566	4.52	2099	4.38	0.458	15.27	200	70	29.00
(68.02)	(33.65)	(7.28)			(0.279)	(3.01)	(93)	(21)	(98.21)
				8th (C1) Gear					
90.10	6729	5.02	2100	3.82	0.463	15.11	199	65	29.00
(67.19)	(29.93)	(8.08)			(0.282)	(2.98)	(93)	(18)	(98.21)
				9th (B4) Gear					
89.72	6028	5.58	2097	3.58	0.465	15.04	206	72	28.98
(66.91)	(26.81)	(8.98)			(0.283)	(2.96)	(96)	(22)	(98.14)
				10th (C2) Gear					
89.73	5542	6.07	2097	3.41	0.465	15.04	204	69	28.98
(66.91)	(24.65)	(9.77)			(0.283)	(2.96)	(95)	(21)	(98.14)
				11th (C3) Gear					
88.34	4527	7.32	2100	2.84	0.472	14.81	204	75	28.97
(65.88)	(20.14)	(11.78)			(0.287)	(2.92)	(95)	(24)	(98.10)
				12th (C4) Gear					
85.18	3551	9.00	2095	2.34	0.490	14.28	207	76	28.96
(63.52)	(15.79)	(14.48)			(0.298)	(2.81)	(97)	(24)	(98.07)

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 157° F *(69°C)*. The performance results on this summary were taken from OECD tests conducted under the Code II Restricted Standard Test Code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1681**, Summary 153, July 21, 1994.

LOUIS I. LEVITICUS
Engineer-in-Charge

R.D. GRISSO
M.F. KOCHER
K. VON BARGEN
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE (FRONT DRIVE DISENGAGED)

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)*
Maximum Power—7th (B3) Gear									
91.61	7742	4.44	2101	4.86	0.455	15.37	206	70	29.00
(68.31)	*(34.44)*	*(7.14)*			*(0.277)*	*(3.03)*	*(96)*	*(21)*	*(98.21)*
75% of Pull at Maximum Power—7th (B3) Gear									
71.93	5789	4.66	2175	3.43	0.503	13.91	198	77	28.95
(53.64)	*(25.75)*	*(7.50)*			*(0.306)*	*(2.74)*	*(92)*	*(25)*	*(98.04)*
50% of Pull at Maximum Power—7th (B3) Gear									
49.30	3875	4.77	2203	2.30	0.599	11.67	191	77	28.95
(36.76)	*(17.23)*	*(7.68)*			*(0.365)*	*(2.30)*	*(88)*	*(25)*	*(98.04)*
75% of Pull at Reduced Engine Speed—11th (C3) Gear									
71.95	5807	4.65	1365	3.51	0.416	16.80	202	79	28.95
(53.65)	*(25.83)*	*(7.48)*			*(0.253)*	*(3.31)*	*(94)*	*(26)*	*(98.04)*
50% of Pull at Reduced Engine Speed—11th (C3) Gear									
49.06	3870	4.75	1380	2.30	0.450	15.53	186	81	28.95
(36.58)	*(17.21)*	*(7.65)*			*(0.274)*	*(3.06)*	*(86)*	*(27)*	*(98.04)*

MAXIMUM POWER IN SELECTED GEARS

5th (B1) Gear									
75.89	10015	2.84	2148	14.01	0.524	13.36	196	72	29.08
(56.59)	*(44.55)*	*(4.57)*			*(0.318)*	*(2.63)*	*(91)*	*(22)*	*(98.48)*
6th (B2) Gear									
87.83	9219	3.57	2100	8.16	0.472	14.82	204	77	29.08
(65.49)	*(41.01)*	*(5.75)*			*(0.287)*	*(2.92)*	*(95)*	*(25)*	*(98.48)*
7th (B3) Gear									
91.61	7742	4.44	2101	4.86	0.455	15.37	206	70	29.00
(68.31)	*(34.44)*	*(7.14)*			*(0.277)*	*(3.03)*	*(96)*	*(21)*	*(98.21)*
8th (C1) Gear									
91.22	6930	4.94	2098	3.91	0.458	15.26	200	66	29.00
(68.02)	*(30.83)*	*(7.94)*			*(0.279)*	*(3.01)*	*(93)*	*(19)*	*(98.21)*
9th (B4) Gear									
90.43	6160	5.51	2102	3.67	0.462	15.14	206	73	28.98
(67.44)	*(27.40)*	*(8.86)*			*(0.281)*	*(2.98)*	*(96)*	*(23)*	*(98.14)*
10th (C2) Gear									
91.41	5729	5.98	2098	3.19	0.456	15.35	203	69	28.98
(68.16)	*(25.48)*	*(9.63)*			*(0.277)*	*(3.02)*	*(95)*	*(21)*	*(98.14)*
11th (C3) Gear									
90.20	4692	7.21	2099	2.70	0.461	15.18	206	75	28.97
(67.26)	*(20.87)*	*(11.60)*			*(0.280)*	*(2.99)*	*(96)*	*(24)*	*(98.10)*
12th (C4) Gear									
87.86	3713	8.87	2098	2.30	0.474	14.75	207	76	28.96
(65.52)	*(16.52)*	*(14.28)*			*(0.288)*	*(2.91)*	*(97)*	*(24)*	*(98.07)*

TRACTOR SOUND LEVEL WITH CAB	**Front Wheel Drive Disengaged dB(A)**	**Engaged dB(A)**
At 75% load in 9th (B4) Gear	71.5	71.5
Bystander in 16th (D4) Gear	83.0	—

TIRES, BALLAST AND WEIGHT

	Tested Without Ballast
Rear Tires—No., size, ply & psi *(kPa)*	Two 18.4R38: *; 16 *(110)*
Front Tires—No., size, ply & psi *(kPa)*	Two 13.6R28;***; 24 *(165)*
Height of Drawbar	21.5 in *(545 mm)*
Static Weight with Operator—Rear	8435 lb *(3826 kg)*
—Front	4470 lb *(2028 kg)*
—Total	12905 lb *(5854 kg)*

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi. *(bar)*	2950 *(203)*
Location	lift cylinders
Hydraulic oil temperature °F *(°C)*	140 *(60)*
Location	hydraulic sump
Category	II
Quick attach	No

With lift cylinders—1 × 70 mm and 1 × 80 mm

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	11178	10092	9491	8851	8061
Lift force on frame *(kN)*	*(49.7)*	*(44.9)*	*(42.2)*	*(39.4)*	*(35.9)*

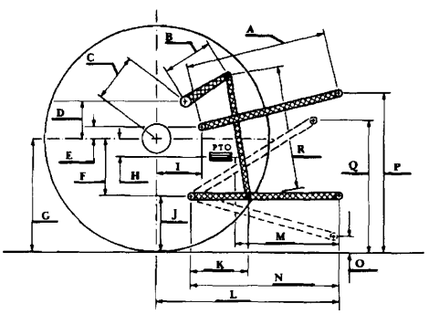
With lift cylinders—2 × 80 mm

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.	12739	11605	10926	10131	9239
Lift force on frame *(kN)*	*(56.7)*	*(51.6)*	*(48.6)*	*(45.1)*	*(41.1)*

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: II
Quick Attach: none

Maximum Force Exerted Through Whole Range:	6858 lbs	*(30.5 kN)*
	7790 lbs	*(34.6 kN)* with 80 mm lift cylinders
i) Opening pressure of relief valve:	NA	
Sustained pressure with pump stalled:	2890 psi	*(199 bar)*
ii) Pump delivery rate at minimum pressure and rated engine speed:	25.9 GPM	*(98.0 l/min)*
iii) Pump delivery rate at maximum hydraulic power:	23.6 GPM	*(89.3 l/min)*
Delivery pressure:	2620 psi	*(181 bar)*
Power:	36.1 HP	*(26.9 kW)*



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	*mm*
A	27.8	*705*
B	15.7	*400*
C	21.8	*554*
D	20.6	*523*
E	4.9	*125*
F	9.8	*250*
G	32.3	*820*
H	3.1	*80*
I	18.0	*456*
J	22.5	*570*
K	21.1	*537*
L	44.2	*1122*
M	19.8	*502*
N	37.9	*962*
O	8.0	*203*
P	46.5	*1180*
Q	35.9	*911*
R	35.0	*889*

JOHN DEERE 7400 POWRQUAD DIESEL

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