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Test 1666: John Deere 7700 Powerquad Diesel 16-speed

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NEBRASKA OECD TRACTOR TEST 1666—SUMMARY 133
JOHN DEERE 7700 POWRQUAD DIESEL
16 SPEED

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

Dates of Test: May 26 to June 21, 1993

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)*** 0.8357 **Fuel weight** 6.958 lbs/gal *(0.834 kg/l)* **Oil SAE** 15W-40 **API service classification** SG/CE **To motor** 4.467 gal *(16.909 l)* **Drained from motor** 4.274 gal *(16.179l)* **Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Front axle lubricant** John Deere GL-5 Gear Lubricant **Total time engine was operated** 30.5 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *RG6076T510512* **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** (as specified) 4.56″ × 4.75″ *(115.8 mm × 120.7 mm)* **Compression ratio** 15.5 to 1 **Displacement** 466 cu in *(7627 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: 52.2-55.8 lb/h *(23.7-25.3 kg/h)* **High idle:** 2225-2325 rpm **Turbo boost** nominal 13.1-16.0 psi *(90-110 kPa)* as measured 15.0 psi *(103 kPa)*

CHASSIS: Type front wheel assist **Serial No.** *RW7700H-001878* **Tread width** rear 59.8″ *(1518 mm)* to 100.3" *(2548 mm)* front 60.0″ *(1524 mm)* to 88.0″ *(2235 mm)* **Wheel base** 110.2″ *(2800 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 1.50 *(2.41)* second 1.81 *(2.91)* third 2.16 *(3.48)* fourth 2.65 *(4.26)* fifth 3.18 *(5.11)* sixth 3.83 *(6.16)* seventh 4.58 *(7.37)* eighth 5.05 *(8.13)* ninth 5.61 *(9.03)* tenth 6.09 *(9.80)* eleventh 7.29 *(11.73)* twelfth 8.93 *(14.37)* thirteenth 10.64 *(17.12)* fourteenth 12.82 *(20.63)* fifteenth 15.34 *(24.68)* sixteenth 18.80 *(30.25)* reverse 1.78 *(2.86)*, 2.14 *(3.45)*, 2.56 *(4.12)*, 3.14 *(5.05)*, 3.77 *(6.06)*, 4.54 *(7.31)*, 5.43 *(8.74)*, 5.99 *(9.64)*, 6.66 *(10.71)*, 7.23 *(11.63)*, 8.64 *(13.91)*, 10.59 *(17.04)* **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 2072 engine rpm and 1000 rpm at 2086 engine rpm **Unladen tractor mass** 14970 lb *(6790 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—1007 rpm)					
126.08 *(94.02)*	2100	7.94 *(30.05)*	0.438 *(0.266)*	15.88 *(3.13)*	
Maximum Power (2 hours)					
126.09 *(94.63)*	1900	7.57 *(28.67)*	0.415 *(0.253)*	16.75 *(3.30)*	
VARYING POWER AND FUEL CONSUMPTION					
126.08 *(94.02)*	2100	7.94 *(30.05)*	0.438 *(0.266)*	15.88 *(3.13)*	Air temperature
111.08 *(82.83)*	2173	7.37 *(27.91)*	0.462 *(0.281)*	15.07 *(2.97)*	76°F *(25°C)*
84.75 *(63.20)*	2211	6.38 *(24.16)*	0.524 *(0.319)*	13.28 *(2.62)*	Relative humidity
57.60 *(42.96)*	2243	5.26 *(19.91)*	0.635 *(0.386)*	10.95 *(2.16)*	50%
28.99 *(21.62)*	2268	4.10 *(15.51)*	0.983 *(0.598)*	7.08 *(1.39)*	Barometer
1.05 *(0.78)*	2290	2.93 *(11.10)*	19.520 *(11.873)*	0.36 *(0.07)*	29.09″ Hg *(98.51 kPa)*

Maximum Torque 484 lb.-ft. *(657 Nm)* at 1098 rpm
Maximum Torque Rise 53.6%
Torque rise at 1704 engine rpm 24.5%

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)*	Fuel Consumption Hp.hr/gal *(kW.h/l)*	Temp.°F (°C) cool-ing med	Temp.°F (°C) Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Power—7th (B3) Gear									
115.61 *(86.21)*	9621 *(42.80)*	4.51 *(7.25)*	2098	3.30	0.477 *(0.290)*	14.57 *(2.87)*	199 *(93)*	62 *(17)*	28.73 *(97.29)*
75% of Pull at Maximum Power—7th (B3) Gear									
91.47 *(68.21)*	7207 *(32.06)*	4.76 *(7.66)*	2196	2.27	0.527 *(0.320)*	13.21 *(2.60)*	192 *(89)*	61 *(16)*	28.74 *(97.32)*
50% of Pull at Maximum Power—7th (B3) Gear									
62.45 *(46.57)*	4806 *(21.38)*	4.87 *(7.84)*	2231	1.56	0.633 *(0.385)*	10.99 *(2.16)*	186 *(86)*	61 *(16)*	28.74 *(97.32)*
75% of Pull at Reduced Engine Speed—10th (C2) Gear									
91.00 *(67.86)*	7214 *(32.09)*	4.73 *(7.61)*	1643	2.35	0.458 *(0.279)*	15.18 *(2.99)*	188 *(86)*	61 *(16)*	28.74 *(97.32)*
50% of Pull at Reduced Engine Speed—10th (C2) Gear									
62.52 *(46.62)*	4813 *(21.41)*	4.87 *(7.84)*	1679	1.48	0.516 *(0.314)*	13.50 *(2.66)*	181 *(83)*	61 *(16)*	28.74 *(97.32)*

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)*	Fuel Consumption Hp.hr/gal *(kW.h/l)*	Temp.°F (°C) cool-ing med	Temp.°F (°C) Air dry bulb	Barom. inch Hg *(kPa)*
				4th (A4) Gear					
93.69 *(69.87)*	14836 *(65.99)*	2.37 *(3.81)*	2163	14.51	0.569 *(0.346)*	12.24 *(2.41)*	194 *(90)*	63 *(17)*	28.68 *(97.12)*
				5th (B1) Gear					
111.31 *(83.00)*	13977 *(62.17)*	2.99 *(4.81)*	2098	7.37	0.494 *(0.301)*	14.07 *(2.77)*	195 *(91)*	61 *(16)*	28.73 *(97.29)*
				6th (B2) Gear					
115.86 *(86.40)*	13122 *(58.37)*	3.31 *(5.33)*	1901	5.95	0.463 *(0.282)*	15.02 *(2.96)*	195 *(90)*	61 *(16)*	28.73 *(97.29)*
				7th (B3) Gear					
118.28 *(88.20)*	10949 *(48.70)*	4.05 *(6.52)*	1900	3.97	0.452 *(0.275)*	15.39 *(3.03)*	199 *(93)*	62 *(17)*	28.73 *(97.29)*
				8th (C1) Gear					
117.13 *(87.34)*	9756 *(43.39)*	4.50 *(7.25)*	1901	3.30	0.459 *(0.279)*	15.17 *(2.99)*	195 *(90)*	61 *(16)*	28.73 *(97.29)*
				9th (B4) Gear					
117.50 *(87.62)*	8789 *(39.09)*	5.01 *(8.07)*	1900	2.96	0.455 *(0.277)*	15.29 *(3.01)*	196 *(91)*	62 *(17)*	28.73 *(97.29)*
				10th (C2) Gear					
117.38 *(87.53)*	8068 *(35.89)*	5.46 *(8.78)*	1900	2.61	0.456 *(0.278)*	15.24 *(3.00)*	196 *(91)*	62 *(17)*	28.73 *(97.29)*
				11th (C3) Gear					
117.09 *(87.31)*	6685 *(29.74)*	6.57 *(10.57)*	1899	2.18	0.459 *(0.279)*	15.16 *(2.99)*	196 *(91)*	62 *(17)*	28.73 *(97.29)*
				12th (C4) Gear					
113.93 *(84.96)*	5286 *(23.51)*	8.08 *(13.01)*	1900	1.65	0.472 *(0.287)*	14.74 *(2.90*	196 *(91)*	62 *(17)*	28.73 *(97.29)*

DRAWBAR PERFORMANCE (BALLASTED)
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)*	Fuel Consumption Hp.hr/gal *(kW.h/l)*	Temp.°F (°C) cool-ing med	Temp.°F (°C) Air dry bulb	Barom. inch Hg *(kPa)*
				3rd (A3) Gear					
90.45 *(67.45)*	17406 *(77.43)*	1.95 *(3.14)*	2174	14.51	0.570 *(0.347)*	12.21 *(2.41)*	191 *(88)*	61 *(16)*	28.89 *(97.83)*
				4th (A4) Gear					
110.48 *(82.38)*	16512 *(73.45)*	2.51 *(4.04)*	2102	7.06	0.499 *(0.303)*	13.95 *(2.75)*	196 *(91)*	61 *(16)*	28.89 *(97.83)*
				5th (B1) Gear					
118.01 *(88.00)*	15753 *(70.07)*	2.81 *(4.52)*	1929	5.54	0.455 *(0.277)*	15.29 *(3.01)*	195 *(90)*	61 *(16)*	28.89 *(97.83)*
				6th (B2) Gear					
118.60 *(88.44)*	13089 *(58.22)*	3.40 *(5.47)*	1902	3.55	0.454 *(0.276)*	15.33 *(3.02)*	195 *(91)*	61 *(16)*	28.89 *(97.83)*
				7th (B3) Gear					
119.54 *(89.14)*	10937 *(48.65)*	4.10 *(6.60)*	1900	2.86	0.449 *(0.273)*	15.50 *(3.05)*	196 *(91)*	61 *(16)*	28.89 *(97.83)*
				8th (C1) Gear					
117.23 *(87.42)*	9643 *(42.89)*	4.56 *(7.34)*	1908	2.61	0.454 *(0.276)*	15.33 *(3.02)*	197 *(92)*	58 *(14)*	28.90 *(97.87)*
				9th (B4) Gear					
114.29 *(85.23)*	8489 *(37.76)*	5.05 *(8.13)*	1898	2.35	0.464 *(0.282)*	14.99 *(2.95)*	199 *(93)*	73 *(23)*	29.06 *(98.41)*
				10th (C2) Gear					
116.66 *(86.99)*	7970 *(35.45)*	5.49 *(8.83)*	1899	2.00	0.457 *(0.278)*	15.22 *(3.00)*	198 *(92)*	59 *(15)*	28.90 *(97.87)*
				11th (C3) Gear					
116.39 *(86.79)*	6606 *(29.38)*	6.61 *(10.63)*	1902	1.65	0.462 *(0.281)*	15.07 *(2.97)*	196 *(91)*	60 *(16)*	28.89 *(97.83)*
				12th (C4) Gear					
113.02 *(84.28)*	5223 *(23.23)*	8.12 *(13.06)*	1901	1.47	0.474 *(0.288)*	14.68 *(2.89)*	196 *(91)*	60 *(16)*	28.89 *(97.83)*

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 143° F *(62°C)*. This tractor did not meet manufacturers claim of 25.4 GPM *(96 l/m)* flow at SCV couplers. 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. **1666**, Summary 133, July 6, 1993.

LOUIS I. LEVITICUS
Engineer-in-Charge

L.L. BASHFORD
R.D. GRISSO
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									
116.01 *(86.51)*	9608 *(42.74)*	4.53 *(7.29)*	2098	2.67	0.472 *(0.287)*	14.74 *(2.90)*	198 *(92)*	61 *(16)*	28.89 *(97.83)*
75% of Pull at Maximum Power—7th (B3) Gear									
91.46 *(68.20)*	7211 *(32.07)*	4.76 *(7.65)*	2193	2.15	0.530 *(0.322)*	13.13 *(2.59)*	191 *(88)*	61 *(16)*	28.89 *(97.83)*
50% of Pull at Maximum Power—7th (B3) Gear									
62.62 *(46.70)*	4813 *(21.41)*	4.88 *(7.85)*	2235	1.53	0.638 *(0.388)*	10.91 *(2.15)*	186 *(85)*	61 *(16)*	28.89 *(98.83)*
75% of Pull at Reduced Engine Speed—10th (C2) Gear									
91.47 *(68.21)*	7204 *(32.04)*	4.76 *(7.66)*	1653	2.15	0.456 *(0.278)*	15.25 *(3.00)*	188 *(87)*	61 *(16)*	28.89 *(98.83)*
50% of Pull at Reduced Engine Speed—10th (C2) Gear									
62.59 *(46.68)*	4822 *(21.45)*	4.87 *(7.83)*	1679	1.53	0.517 *(0.315)*	13.45 *(2.65)*	182 *(83)*	61 *(16)*	28.89 *(98.83)*
MAXIMUM POWER IN SELECTED GEARS									
4th (A4) Gear									
95.73 *(71.38)*	15217 *(67.69)*	2.36 *(3.80)*	2156	14.54	0.562 *(0.342)*	12.38 *(2.44)*	194 *(90)*	61 *(16)*	28.89 *(97.83)*
5th (B1) Gear									
113.59 *(84.70)*	13971 *(62.15)*	3.05 *(4.91)*	2102	5.59	0.483 *(0.294)*	14.40 *(2.84)*	196 *(91)*	61 *(16)*	28.89 *(97.83)*
6th (B2) Gear									
114.88 *(85.67)*	11487 *(51.09)*	3.75 *(6.04)*	2101	3.52	0.477 *(0.290)*	14.57 *(2.87)*	196 *(91)*	61 *(16)*	28.89 *(97.83)*
7th (B3) Gear									
116.01 *(86.51)*	9608 *(42.74)*	4.53 *(7.29)*	2098	2.67	0.472 *(0.287)*	14.74 *(2.90)*	198 *(92)*	61 *(16)*	28.89 *(97.83)*
8th (C1) Gear									
113.10 *(84.34)*	8459 *(37.63)*	5.01 *(8.07)*	2101	2.41	0.485 *(0.295)*	14.36 *(2.83)*	196 *(91)*	58 *(14)*	28.90 *(97.87)*
9th (B4) Gear									
114.03 *(85.03)*	7684 *(34.18)*	5.57 *(8.96)*	2097	2.32	0.479 *(0.292)*	14.52 *(2.86)*	200 *(93)*	62 *(17)*	28.89 *(97.83)*
10th (C2) Gear									
112.82 *(84.13)*	6990 *(31.09)*	6.05 *(9.74)*	2098	2.06	0.484 *(0.295)*	14.37 *(2.83)*	198 *(92)*	59 *(15)*	28.90 *(97.87)*
11th (C3) Gear									
112.18 *(83.65)*	5782 *(25.72)*	7.28 *(11.71)*	2099	1.80	0.490 *(0.298)*	14.21 *(2.80)*	197 *(92)*	60 *(16)*	28.89 *(97.83)*
12th (C4) Gear									
107.91 *(80.47)*	4519 *(20.10)*	8.96 *(14.41)*	2102	1.45	0.508 *(0.309)*	13.69 *(2.70)*	198 *(92)*	60 *(16)*	28.89 *(97.83)*

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive Disengaged dB(A)	Front Wheel Drive Engaged dB(A)
Gear closest to 4.7 mph *(7.5 km/h)* 7th (B3) Gear	71.5	71.5
Maximum sound level	71.5	71.5
Transport speed 16th (D4) Gear	72.5	—
Bystander 16th (D4) Gear	83.5	—

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 18.4R42:**;12 *(85)*	Two 18.4R42: **; 16 *(110)*
Ballast	—Duals (total)	1670 lb *(757 kg)*	None
	—Test equip (total)	170 lb *(77 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 14.9R30;***; 23 *(160)*	Two 14.9R30;***; 23 *(160)*
Ballast	—Liquid (total)	None	None
	—Cast Iron (total)	None	None
Height of Drawbar		22.5 in *(570 mm)*	21.5 in. *(545 mm)*
Static Weight with Operator	—Rear	11736 lb *(5323 kg)*	9900 lb *(4491 kg)*
	—Front	5240 lb *(2377 kg)*	5234 lb *(2374 kg)*
	—Total	16976 lb *(7700 kg)*	15134 lb *(6865 kg)*

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III		
Quick Attach: Waltersheid lower link ends		
Maximum Force Exerted Through Whole Range:	10161 lbs	*(45.2 kN)*
i) Opening pressure of relief valve:	NA	
Sustained pressure with pump stalled:	2880 psi	*(198 bar)*
ii) Pump delivery rate at minimum pressure and rated engine speed:	22.2 GPM	*(84.0 l/min)*
iii) Pump delivery rate at maximum hydraulic power:	20.6 GPM	*(78.0 l/min)*
Delivery pressure:	2610 psi	*(180 bar)*
Power:	31.4 HP	*(23.4 kW)*

THREE POINT HITCH PERFORMANCE (SAE Static Test)

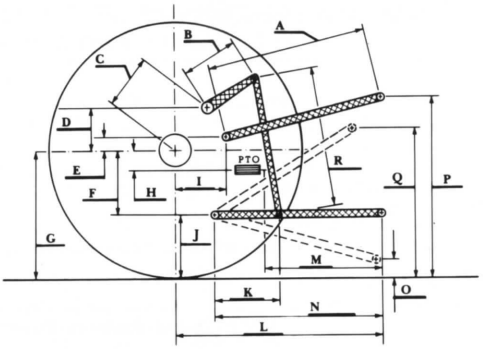
Observed Maximum Pressure psi. *(bar)*	2880 *(198)*
Location	remote outlet
Hydraulic oil temperature °F *(°C)*	144 *(62)*
Location	hydraulic sump
Category	IIIN
Quick attach	No

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

Hitch point distance to ground level	8.1 *(206)*	16.0 *(406)*	24.0 *(610)*	32.0 *(813)*	40.0 *(1016)*
Lift force on frame lb	11959	11949	11605	10760	9168
Lift force on frame *(kN)*	*(53.2)*	*(53.2)*	*(51.6)*	*(47.9)*	*(40.8)*

With lift cylinders—2 × 80 mm

Hitch point distance to ground level in. *(mm)*	7.7 *(196)*	16.0 *(406)*	24.0 *(610)*	32.0 *(813)*	40.0 *(1016)*
Lift force on frame lb.	13295	13718	13295	12303	10426
Lift force on frame *(kN)*	*(59.1)*	*(61.0)*	*(59.1)*	*(54.7)*	*(46.4)*



HITCH DIMENSIONS AS TESTED—NO LOAD

	OECD test		SAE test	
	inch	*mm*	inch	*mm*
A	27.2	*692*	26.6	*676*
B	14.8	*375*	14.8	*375*
C	24.5	*623*	24.5	*623*
D	23.1	*588*	23.1	*588*
E	11.1	*283*	7.5	*190*
F	10.8	*275*	10.8	*275*
G	35.6	*905*	34.3	*870*
H	4.1	*105*	4.1	*105*
I	19.8	*504*	19.8	*504*
J	24.8	*630*	23.4	*595*
K	24.1	*612*	23.1	*587*
L	47.5	*1206*	46.4	*1179*
M	23.1	*586*	22.0	*559*
N	39.8	*1011*	38.7	*984*
O	9.0	*229*	8.0	*203*
P	51.8	*1315*	45.4	*1153*
Q	38.8	*984*	36.8	*933*
R	38.1	*968*	35.9	*911*

JOHN DEERE 7700 POWRQUAD DIESEL

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director