

# NEBRASKA OECD TRACTOR TEST 1940—SUMMARY 616

## JOHN DEERE 9230 DIESEL

### 18 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—1109 rpm)</b>					
265.73 (198.15)	2101	15.58 (58.97)	0.409 (0.249)	17.06 (3.36)	
<b>Standard Power Take-off Speed—(PTO speed—1000 rpm)</b>					
306.82 (228.80)	1895	17.09 (64.68)	0.389 (0.236)	17.96 (3.54)	
<b>Maximum Power (1 hour)</b>					
312.59 (233.10)	1799	17.54 (66.39)	0.391 (0.238)	17.82 (3.51)	

#### VARYING POWER AND FUEL CONSUMPTION

265.73 (198.15)	2101	15.58 (58.97)	0.409 (0.249)	17.06 (3.36)	Air temperature
228.18 (170.15)	2123	13.85 (52.43)	0.424 (0.258)	16.47 (3.25)	77°F (25°C)
172.46 (128.61)	2136	11.48 (43.44)	0.464 (0.282)	15.03 (2.96)	Relative humidity
115.92 (86.44)	2159	8.95 (33.86)	0.538 (0.327)	12.96 (2.55)	26%
58.48 (43.61)	2171	6.22 (23.55)	0.742 (0.452)	9.40 (1.85)	Barometer
1.97 (1.47)	2186	4.46 (16.90)	15.779 (9.598)	0.44 (0.09)	29.02" Hg (98.27 kPa)

Maximum Torque - 1004 lb.-ft. (1362 Nm) at 1349 rpm  
 Maximum Torque Rise - 51.1%  
 Torque rise at 1701 engine rpm - 44%  
 Power increase at 1799 engine rpm - 17.6%

#### DRAWBAR PERFORMANCE (Unballasted)

##### 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—7th Gear</b>									
241.53 (180.11)	19210 (85.45)	4.72 (7.59)	2099	3.3	0.444 (0.270)	15.71 (3.09)	194 (90)	68 (20)	28.77 (97.43)
<b>75% of Pull at Maximum Power—7th Gear</b>									
188.52 (140.58)	14418 (64.13)	4.90 (7.89)	2166	2.6	0.475 (0.289)	14.68 (2.89)	187 (86)	73 (23)	28.73 (97.29)
<b>50% of Pull at Maximum Power—7th Gear</b>									
127.40 (95.00)	9606 (42.73)	4.97 (8.00)	2190	2.1	0.546 (0.332)	12.77 (2.52)	180 (82)	69 (21)	28.89 (97.83)
<b>75% of Pull at Reduced Engine Speed—10th Gear</b>									
188.25 (140.38)	14431 (64.19)	4.89 (7.87)	1579	2.6	0.460 (0.280)	15.18 (2.99)	197 (92)	73 (23)	28.73 (97.29)
<b>50% of Pull at Reduced Engine Speed—10th Gear</b>									
127.49 (95.07)	9593 (42.67)	4.98 (8.02)	1603	2.2	0.495 (0.301)	14.08 (2.77)	184 (84)	70 (21)	28.89 (97.83)

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

**Dates of Test:** October 1 -14, 2008

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

**FUEL, OIL and TIME:** Fuel No. 2 Diesel Specific gravity converted to 60°/60°F (15°/15°C) 0.8380 Fuel weight 6.977 lbs/gal (0.836 kg/l) Oil SAE 15W-40 API service classification CH-4 Transmission, hydraulic and final drive lubricant John Deere Hy-Gard fluid Total time engine was operated: 25.5 hours

**ENGINE: Make** John Deere Diesel **Type** six cylinder vertical with turbocharger and air to air aftercooler **Serial No.** \*RG6090L036851\* **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** 4.661" x 5.354" (118.4 mm x 136.0 mm) **Compression ratio** 16.3 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 oil, radiator for transmission, front and rear axle oil **Fuel filter** two paper cartridges **Fuel cooler** radiator for returned fuel **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan

**ENGINE OPERATING PARAMETERS: Fuel rate:** 106.5 - 115.1 lb/h (48.3 - 52.2 kg/h) **High idle:** 2215 - 2265 rpm (2160 - 2200 rpm with PTO engaged) **Turbo boost:** nominal 30.5 - 34.8 psi (210 - 240 kPa) as measured 32.6 psi (225 kPa)

**CHASSIS: Type** four wheel drive with duals **Serial No.** \*RW9230P003378\* **Tread width** rear 63.0" (1600 mm) to 135.8" (3450 mm), front 63.0" (1600 mm) to 135.8" (3450 mm) **Wheelbase** 137.7" (3498 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 2.37 (3.81) second 2.91 (4.69) third 3.22 (5.19) fourth 3.60 (5.79) fifth 3.96 (6.38) sixth 4.42 (7.12) seventh 4.90 (7.89) eighth 5.47 (8.81) ninth 6.03 (9.71) tenth 6.74 (10.84) eleventh 7.46 (12.01) twelfth 8.25 (13.27) thirteenth 9.18 (14.77) fourteenth 10.15 (16.33) fifteenth 12.54 (20.18) sixteenth 15.43 (24.83) seventeenth 19.08 (30.70) eighteenth 23.48 (37.78) reverse 2.37 (3.81), 3.23 (5.19), 3.60 (5.79), 4.90 (7.89), 5.47 (8.81), 7.46 (12.00)

## DRAWBAR PERFORMANCE

(Unballasted at 2100 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 cool- ing med	Temp. °C Air dry bulb	Barom. inch Hg (kPa)
1st Gear									
197.89 (147.57)	34414 (153.08)	2.16 (3.46)	2156	10.9	0.497 (0.302)	14.04 (2.76)	183 (84)	56 (13)	28.88 (97.80)
2nd Gear									
230.39 (171.80)	32458 (144.38)	2.66 (4.28)	2101	8.0	0.467 (0.284)	14.95 (2.95)	184 (84)	60 (16)	28.88 (97.80)
3rd Gear									
240.18 (179.10)	29780 (132.47)	3.02 (4.87)	2101	5.5	0.447 (0.272)	15.59 (3.07)	184 (84)	58 (14)	28.88 (97.80)
4th Gear									
240.20 (179.11)	26355 (117.23)	3.42 (5.50)	2101	4.4	0.448 (0.272)	15.58 (3.07)	186 (85)	61 (16)	28.88 (97.80)
5th Gear									
242.57 (180.89)	24136 (107.36)	3.77 (6.07)	2101	4.0	0.443 (0.269)	15.75 (3.10)	188 (87)	62 (17)	28.88 (97.80)
6th Gear									
240.29 (179.19)	21278 (94.65)	4.24 (6.82)	2101	3.6	0.447 (0.272)	15.62 (3.08)	186 (86)	64 (18)	28.88 (97.80)
7th Gear									
241.53 (180.11)	19210 (85.45)	4.72 (7.59)	2099	3.3	0.444 (0.270)	15.71 (3.09)	194 (90)	68 (20)	28.77 (97.43)
8th Gear									
239.60 (178.67)	17083 (75.99)	5.26 (8.46)	2099	3.2	0.450 (0.274)	15.51 (3.06)	193 (89)	68 (20)	28.77 (97.43)
9th Gear									
236.82 (176.60)	15219 (67.70)	5.84 (9.39)	2097	3.1	0.455 (0.277)	15.32 (3.02)	194 (90)	69 (21)	28.76 (97.39)
10th Gear									
235.44 (175.56)	13577 (60.39)	6.50 (10.47)	2100	2.8	0.458 (0.279)	15.24 (3.00)	196 (91)	69 (21)	28.76 (97.39)
11th Gear									
235.49 (175.60)	12265 (54.56)	7.20 (11.59)	2100	2.5	0.458 (0.279)	15.22 (3.00)	198 (92)	69 (21)	28.76 (97.39)
12th Gear									
240.61 (179.42)	11235 (49.97)	8.03 (12.93)	2103	2.2	0.446 (0.271)	15.65 (3.08)	194 (90)	71 (22)	28.75 (97.36)

**Clutch** wet multiple disc hydraulically actuated by foot pedal **Brakes** wet multiple disc hydraulically actuated foot pedal **Steering** hydrostatic and articulated **Power take-off** 1000 rpm at 1895 engine rpm **Unladen tractor mass** 34335 lb (15574 kg)

**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 primary fuel filter was maintained at 107°F (42°C). The performance figures on this summary were taken from a test conducted under the OECD Code II test procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1940**, Nebraska Summary 616, January 12, 2009.

Roger M. Hoy  
Director

M.F. Kocher  
V.I. Adamchuk  
J.A. Smith  
Board of Tractor Test Engineers

### TRACTOR SOUND LEVEL WITH CAB

dB(A)

At no load in 6th gear	71.9
Transport speed - no load - 18th gear	72.8
Bystander in 18th gear	86.8

### TIRES, BALLAST AND WEIGHT

**Rear Tires** - No., size, ply & psi (kPa)

**Front Tires** - No., size, ply & psi (kPa)

**Height of Drawbar**

**Static Weight with operator** - Rear

- Front

- Total

### Tested Without Ballast

Four 520/85R42;\*\*\*;10(70)

Four 520/85R42;\*\*\*;13(90)

20.5 in (520 mm)

14435 lb (6548 kg)

20075 lb (9106 kg)

34510 lb (15654 kg)

**DRAWBAR PERFORMANCE**  
**(Unballasted at 1800 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)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
1st Gear									
198.68 (148.16)	34440 (153.20)	2.16 (3.48)	2156	10.5	0.495 (0.301)	14.09 (2.78)	184 (84)	57 (14)	28.88 (97.80)
2nd Gear									
232.72 (173.54)	33537 (149.18)	2.60 (4.19)	2078	8.9	0.468 (0.285)	14.90 (2.94)	185 (85)	59 (15)	28.88 (97.80)
3rd Gear									
250.24 (186.61)	32378 (144.02)	2.90 (4.66)	2043	6.8	0.446 (0.271)	15.65 (3.08)	184 (84)	59 (15)	28.88 (97.80)
4th Gear									
260.22 (194.05)	31837 (141.62)	3.07 (4.93)	1953	6.6	0.445 (0.270)	15.69 (3.09)	189 (87)	62 (17)	28.88 (97.80)
5th Gear									
272.06 (202.88)	30543 (135.86)	3.34 (5.38)	1908	6.0	0.431 (0.262)	16.18 (3.19)	191 (88)	64 (18)	28.88 (97.80)
6th Gear									
275.07 (205.12)	29081 (129.36)	3.55 (5.71)	1798	5.4	0.441 (0.268)	15.84 (3.12)	196 (91)	63 (17)	28.88 (97.80)
7th Gear									
281.94 (210.25)	26650 (118.54)	3.97 (6.38)	1800	4.9	0.429 (0.261)	16.27 (3.21)	201 (94)	65 (18)	28.88 (97.80)
8th Gear									
281.31 (209.77)	23709 (105.46)	4.45 (7.16)	1803	4.6	0.429 (0.261)	16.25 (3.20)	201 (94)	65 (18)	28.88 (97.80)
9th Gear									
279.78 (208.63)	21218 (94.38)	4.94 (7.96)	1799	4.2	0.431 (0.262)	16.18 (3.19)	201 (94)	65 (18)	28.88 (97.80)
10th Gear									
276.28 (206.02)	18727 (83.30)	5.53 (8.90)	1801	3.6	0.438 (0.266)	15.94 (3.14)	197 (91)	69 (21)	28.76 (97.39)
11th Gear									
277.53 (206.95)	16996 (75.60)	6.12 (9.85)	1801	3.3	0.436 (0.265)	16.01 (3.15)	197 (92)	69 (21)	28.75 (97.36)
12th Gear									
277.57 (206.98)	15232 (67.75)	6.83 (11.00)	1799	2.7	0.437 (0.266)	15.97 (3.15)	201 (94)	73 (23)	28.74 (97.33)
13th Gear									
271.37 (202.36)	13404 (59.62)	7.59 (12.22)	1803	2.4	0.445 (0.270)	15.69 (3.09)	198 (92)	71 (22)	28.75 (97.36)
14th Gear									
277.33 (206.80)	12280 (54.62)	8.47 (13.63)	1801	2.1	0.435 (0.265)	16.03 (3.16)	198 (92)	72 (22)	28.74 (97.33)

## HYDRAULIC PERFORMANCE

CATEGORY: III, IVN

Quick Attach: yes

OECD Static test

Maximum force exerted through whole range: 15712 lbs (69.9 kN) (Cat III)  
15677 lbs (69.7 kN) (Cat IVN)

i) Sustained pressure at compensator cutoff: 2990 psi (206 bar)

**18 speed Powershift Transmission**

**Single outlet set    Three outlet sets combined**

ii) Pump delivery rate at minimum pressure and rated engine speed: 37.7 GPM (142.6 l/min) 51.1 GPM (193.4 l/min)

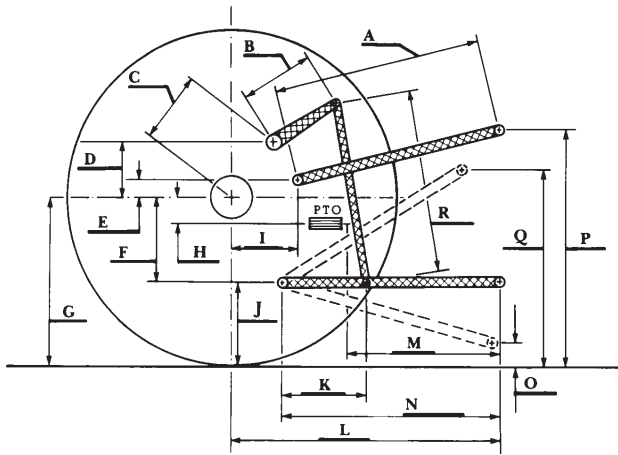
iii) Pump delivery rate at maximum hydraulic power: 35.3 GPM (133.7 l/min) 49.4 GPM (187.0 l/min)  
Delivery pressure: 2039 psi (141 bar) 2542 psi (175 bar)  
Power: 42.0 HP (31.3 kW) 73.2 HP (54.6 kW)

**24 speed manual shift transmission**

**Single outlet set    Three outlet sets combined**

ii) Pump delivery rate at minimum pressure and rated engine speed: 38.5 GPM (145.6 l/min) 46.2 GPM (174.8 l/min)

iii) Pump delivery rate at maximum hydraulic power: 35.9 GPM (135.9 l/min) 44.2 GPM (167.3 l/min)  
Delivery pressure: 2234 psi (154 bar) 2606 psi (180 bar)  
Power: 46.8 HP (34.9 kW) 67.2 HP (50.1 kW)



**HITCH DIMENSIONS AS TESTED—NO LOAD**

	Category III		Category IVN	
	inch	mm	inch	mm
A	30.7	780	30.9	785
B	18.6	472	18.6	472
C	26.2	666	26.2	666
D	24.4	620	24.4	620
E	11.3	288	11.3	288
F	13.8	350	13.8	350
G	36.2	920	36.2	920
H	4.0	101	4.0	101
I	22.7	577	22.7	577
J	22.4	570	22.4	570
K	28.8	731	28.3	718
L	55.3	1405	54.5	1385
*L'	61.3	1557	61.8	1570
M	31.4	797	31.9	810
N	44.0	1117	43.2	1097
O	9.0	230	9.0	230
P	49.4	1255	49.4	1256
Q	41.3	1050	41.5	1053
R	43.7	1110	43.7	1110

\*L' to Quick Attach ends



**JOHN DEERE 9230 DIESEL**