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Test 1632: John Deere 8960 Powershift Diesel 12-Speed

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 1632—SUMMARY 070

JOHN DEERE 8960 POWERSHIFT DIESEL

12 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
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1002 rpm)					
332.25 (247.76)	1900	19.65 (74.37)	0.409 (0.249)	16.91 (3.33)	
Maximum Power (2 Hours)					
337.42 (251.62)	1749	19.27 (72.93)	0.395 (0.240)	17.51 (3.45)	

VARYING POWER AND FUEL CONSUMPTION

332.25 (247.76)	1900	19.65 (74.37)	0.409 (0.249)	16.91 (3.33)	Air temperature
295.28 (220.19)	1987	18.89 (71.49)	0.442 (0.269)	15.63 (3.08)	75°F (24°C)
227.05 (169.31)	2037	15.80 (59.82)	0.481 (0.293)	14.37 (2.83)	Relative humidity
153.19 (114.23)	2062	12.55 (47.50)	0.566 (0.344)	12.21 (2.41)	37%
77.49 (57.79)	2086	9.03 (34.18)	0.805 (0.490)	8.58 (1.69)	Barometer
0.95 (0.71)	2131	6.16 (23.34)	44.681 (27.178)	0.15 (0.03)	29.08" Hg (98.47 kPa)

Maximum Torque 1279 lb.-ft (1734 Nm) at 1200 rpm

Maximum Torque Rise 39.3%

Torque Rise at 1000 engine rpm 31%

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—6th Gear									
302.04 (225.23)	17625 (78.40)	6.43 (10.34)	1899	2.18	0.447 (0.272)	15.45 (3.04)	186 (86)	58 (14)	29.13 (98.65)
75% of Pull at Maximum Power—6th Gear									
243.50 (181.58)	13219 (58.80)	6.91 (11.12)	2030	1.64	0.523 (0.318)	13.22 (2.60)	181 (83)	58 (14)	29.11 (98.58)
50% of Pull at Maximum Power—6th Gear									
165.56 (123.46)	8820 (39.23)	7.04 (11.33)	2059	1.27	0.570 (0.347)	12.12 (2.39)	178 (81)	58 (14)	29.10 (98.54)
75% of Pull at Reduced Engine Speed—8th Gear									
243.32 (181.44)	13223 (58.82)	6.90 (11.11)	1544	1.73	0.422 (0.257)	16.36 (3.22)	185 (85)	58 (14)	29.11 (98.58)
50% of Pull at Reduced Engine Speed—8th Gear									
165.76 (123.61)	8813 (39.20)	7.05 (11.35)	1571	1.18	0.465 (0.283)	14.86 (2.93)	179 (81)	58 (14)	29.10 (98.54)

Location of Test: Center for Agricultural Equipment, Lincoln Nebraska 68583-0832, U.S.A.

Dates of Test: September-October, 1989

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel Cetane No. 51.1 Specific gravity converted to 60°/60°F (15°/15°C) 0.8300 Fuel weight 6.910 lbs/gal (0.828 kg/l) Oil SAE 15W40 API service classification CD/SD To motor 8.009 gal (30.317 l) Drained from motor 7.953 gal (30.107 l) Transmission, hydraulic and final drive lubricant John Deere HyGard fluid Total time engine was operated 22.5 hours.

ENGINE: Make Cummins Diesel Type six cylinder vertical with turbocharger and intercooler Serial No. 11527700 Crankshaft lengthwise Rated engine speed 1900 Bore and stroke (as specified) 5.50" × 6.00" (139.7 mm × 152.4 mm) Compression ratio 14.0 to 1 Displacement 855 cu in (14011 ml) Starting system 12 volt Lubrication pressure Air cleaner two paper elements and aspirator Oil filter two full flow cartridges Oil cooler engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil Fuel filter one paper cartridge Fuel cooler radiator for injection pump return fuel Muffler vertical Cooling medium temperature control one thermostat and variable speed fan.

ENGINE OPERATING PARAMETERS: Fuel rate 130.2-142.1 lb/hr (59.0-64.5 kg/hr) High idle 2080-2180 rpm Turbo boost nominal 19-23 psi (131-159 kPa) as measured 21.5 psi (148 kPa).

CHASSIS: Type four wheel drive with duals Serial No. *RW8960P001169* Tread width rear 78.8" (2002 mm) to 144.1" (3659 mm) front 78.8" (2002 mm) to 144.1" (3659 mm) Wheel base 133.9" (3400 mm) Hydraulic control system direct engine drive Transmission selective gear fixed ratio with full range operator controlled powershift Nominal travel speeds mph (km/h) first 2.43 (3.91) second 3.22 (5.18) third 4.22 (6.80) fourth 4.94 (7.96) fifth 5.71 (9.19) sixth 6.56 (10.56) seventh 7.56 (12.17) eighth 8.61 (13.86) ninth 9.92 (15.98) tenth 11.63 (18.73) eleventh 15.41 (24.82) twelfth 20.23 (32.58) reverse 3.00 (4.83), 6.12 (9.85), Clutch multiple wet disc hydraulically power actuated by foot pedal Brakes multiple wet disc hydraulically power actuated by foot pedal Steering hydrostatic and articulated Power take-off 1003 rpm at 1900 engine rpm Unladen tractor mass 35115 lb (15928 kg).

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

DRAWBAR PERFORMANCE AT 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)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
1st Gear									
222.34 (165.80)	34913 (155.30)	2.39 (3.84)	2024	7.82	0.488 (0.297)	14.17 (2.79)	181 (83)	49 (9)	29.34 (99.36)
2nd Gear									
284.31 (212.01)	34795 (154.77)	3.06 (4.93)	1944	7.17	0.465 (0.283)	14.86 (2.93)	181 (83)	47 (8)	29.34 (99.36)
3rd Gear									
301.01 (224.47)	30143 (134.08)	3.74 (6.03)	1765	4.66	0.443 (0.269)	15.61 (3.07)	184 (84)	69 (21)	29.12 (98.61)
4th Gear									
304.47 (227.04)	25916 (115.28)	4.41 (7.09)	1752	3.79	0.437 (0.266)	15.81 (3.11)	189 (87)	72 (22)	29.11 (98.58)
5th Gear									
304.24 (226.87)	22304 (99.21)	5.12 (8.23)	1752	2.90	0.437 (0.266)	15.82 (3.12)	190 (88)	74 (23)	29.11 (98.58)
6th Gear									
307.78 (229.51)	19562 (87.02)	5.90 (9.50)	1750	2.63	0.430 (0.262)	16.06 (3.16)	190 (88)	75 (24)	29.10 (98.54)
7th Gear									
307.19 (229.07)	16888 (75.12)	6.82 (10.98)	1748	2.18	0.431 (0.262)	16.02 (3.15)	190 (88)	77 (25)	29.10 (98.54)
8th Gear									
303.59 (226.38)	14565 (64.79)	7.82 (12.58)	1753	1.82	0.435 (0.265)	15.88 (3.13)	191 (88)	80 (27)	29.09 (98.51)
9th Gear									
303.95 (226.66)	12634 (56.20)	9.02 (14.52)	1750	1.64	0.436 (0.265)	15.86 (3.12)	189 (87)	82 (28)	29.09 (98.51)

DRAWBAR PERFORMANCE AT 1900 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 (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
2nd Gear									
289.00 (215.51)	34967 (155.54)	3.10 (4.99)	1953	6.51	0.451 (0.275)	15.31 (3.02)	184 (84)	45 (7)	29.34 (99.36)
3rd Gear									
300.36 (223.98)	27737 (123.38)	4.06 (6.54)	1896	3.96	0.448 (0.273)	15.41 (3.04)	184 (84)	66 (19)	29.11 (98.58)
4th Gear									
300.22 (223.87)	23470 (104.40)	4.80 (7.72)	1896	3.26	0.456 (0.278)	15.14 (2.98)	188 (87)	71 (22)	29.11 (98.58)
5th Gear									
302.90 (225.88)	20415 (90.81)	5.56 (8.95)	1898	2.63	0.449 (0.273)	15.39 (3.03)	189 (87)	73 (23)	29.11 (98.58)
6th Gear									
302.04 (225.23)	17625 (78.40)	6.43 (10.34)	1899	2.18	0.447 (0.272)	15.45 (3.04)	186 (86)	58 (14)	29.13 (98.65)
7th Gear									
300.54 (224.11)	15160 (67.44)	7.43 (11.96)	1900	2.00	0.449 (0.273)	15.38 (3.03)	191 (88)	78 (26)	29.10 (98.54)
8th Gear									
298.53 (222.61)	13183 (58.64)	8.49 (13.67)	1901	1.82	0.454 (0.276)	15.23 (3.00)	185 (85)	58 (14)	29.12 (98.61)

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 102° F (39° C). This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. The pull in 1st and 2nd gears was limited to avoid tractor bouncing. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1632**, Summary 070, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB**dB(A)**

Gear closest to 4.7 mph (7.5 km/h)—3rd Gear	79.0
Maximum sound level	80.0
Transport speed—no load—12th Gear	79.0
Bystander in 12th Gear	90.0

LUGGING ABILITY IN 6th GEAR

Crankshaft Speed rpm	1899	1712	1520	1324	1139	960
Pull—lbs *	17625	20207	22113	24277	24863	22730
(kN)	(78.40)	(89.89)	(98.36)	(107.99)	(110.60)	(101.11)
Increase in Pull %	0	15	25	38	41	29
Power—Hp	302.04	311.25	301.44	287.18	252.50	195.17
(kW)	(225.23)	(232.10)	(224.78)	(214.15)	(188.29)	(145.54)
Speed—Mph	6.43	5.78	5.11	4.44	3.81	3.22
(km/h)	(10.34)	(9.30)	(8.23)	(7.14)	(6.13)	(5.18)
Slip %	2.18	2.54	2.72	3.26	3.44	3.08

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi. (bar)	2510 (173)				
Location	remote outlet				
Hydraulic oil temperature °F(°C)	130 (54)				
Location	hydraulic sump				
Category	IV				
Quick attach	Yes				
Hitch point distance to ground level in. (mm)	9.0 (229)	16.2 (411)	26.4 (670)	38.4 (975)	46.0 (1168)
Lift force on frame lb.	15978	16368	16514	15334	13968
" " " " " " (kN)	(71.1)	(72.8)	(73.5)	(68.2)	(62.1)

TIRES AND WEIGHT**Tested Without Ballast**

Rear Tires	—No., size, ply & psi (kPa)	Four 20.8R42; **, 14 (95)
Front Tires	—No., size, ply & psi (kPa)	Four 20.8R42; **, 14 (95)
Height of Drawbar		19 in (485 mm)
Static Weight	—Rear	15535 lb (7047 kg)
	—Front	19580 lb (8881 kg)
	—Total	35115 lb (15928 kg)

**THREE POINT HITCH PERFORMANCE
(OECD Static Test)**

CATEGORY: IV

Quick Attach: Yes

Maximum Force Exerted Through Whole Range:

11701 lbs (52.0 kN)

i) Opening pressure of relief valve:

NA

Sustained pressure with pump stalled:

2510 psi (173 Bar)

ii) Pump delivery rate at minimum pressure:

43.1 GPM (163.2 l/min)

iii) Pump delivery rate at maximum

hydraulic power:

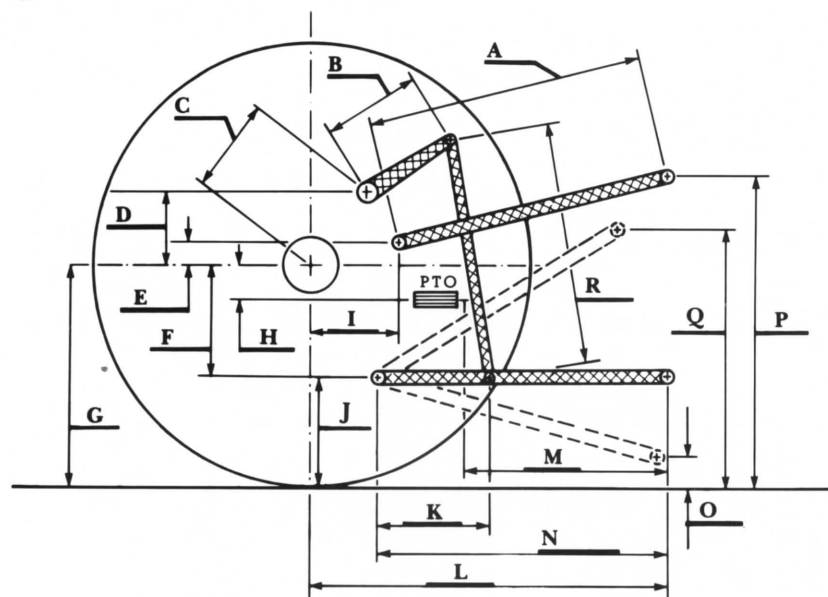
39.9 GPM (151.0 l/min)

Delivery pressure:

1900 psi (131 Bar)

Power:

44.2 Hp (33.0 kW)



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	31.0	787
B	18.6	472
C	26.2	666
D	24.4	620
E	11.3	288
F	13.8	350
G	36.1	918
H	4.8	122
I	22.7	577
J	22.3	568
K	28.3	718
L	54.5	1385
L'	60.5	1537
M	24.6	625
N	43.2	1097
O	8.9	226
P	49.3	1254
Q	40.9	1039
R	44.6	1133

L' to end of Quick attach



John Deere 8960 Powershift Diesel