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2020

## Test 2223: John Deere 8R 370

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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# NEBRASKA OECD TRACTOR TEST 2223-SUMMARY 1170

## JOHN DEERE 8R 370 DIESEL

### INFINITELY VARIABLE TRANSMISSION

#### 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—1050 rpm)</b>						
325.05 (242.39)	2100	17.08 (64.67)	0.367 (0.223)	19.03 (3.75)	0.53 (2.00)	Fuel used during active exhaust regeneration-0.85 gal (3.24 l) (see note 1, p.2)
<b>Standard Power Take-off Speed(1000 rpm)</b>						
354.41 (264.28)	2000	18.34 (69.42)	0.361 (0.220)	19.32 (3.81)	0.56 (2.12)	
<b>Maximum Power (1 hour)</b>						
371.22 (276.82)	1750	18.66 (70.65)	0.351 (0.214)	19.89 (3.92)	0.59 (2.25)	

#### VARYING POWER AND FUEL CONSUMPTION

325.05 (242.39)	2100	17.08 (64.67)	0.367 (0.223)	19.03 (3.75)	0.53 (2.00)	Air temperature
290.38 (216.54)	2203	15.82 (59.89)	0.380 (0.231)	18.35 (3.62)	0.46 (1.75)	72°F (22°C)
218.32 (162.80)	2210	12.50 (47.33)	0.400 (0.243)	17.46 (3.44)	0.38 (1.43)	Relative humidity
145.36 (108.39)	2210	9.31 (35.26)	0.447 (0.272)	15.61 (3.07)	0.29 (1.10)	26%
72.80 (54.29)	2210	6.59 (24.96)	0.632 (0.385)	11.04 (2.18)	0.19 (0.72)	Barometer
1.60 (1.20)	2210	4.37 (16.55)	19.043 (11.584)	0.37 (0.07)	0.11 (0.42)	29.05" Hg (98.38 kPa)

Maximum Torque - 1190 lb.-ft. (1614 Nm) at 1550 rpm

Maximum Torque Rise - 46.4%

Torque rise at 1680 engine rpm - 42%

Power increase at 1750 engine rpm - 14.2%

#### 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)	D.E.F. Consumption Hp.hr/gal (kW.h/l)	Temp. °F(°C) cool- ing dry med bulb	Barom. inch Hg (kPa)
<b>Power at Rated Engine Speed—6.2 mph (10.0 km/h)-Manual mode</b>								
284.85 (212.41)	19312 (85.90)	5.53 (8.90)	2099	4.7	0.420 (0.255)	16.63 (3.28)	0.014 (0.009)	211 (99)
<b>75% of Pull at Rated Engine Speed—6.2 mph (10.0 km/h)-Manual mode</b>								
226.89 (169.19)	14471 (64.37)	5.88 (9.46)	2208	3.5	0.442 (0.269)	15.79 (3.11)	0.013 (0.008)	211 (99)
<b>50% of Pull at Rated Engine Speed—6.2 mph (10.0 km/h)-Manual mode</b>								
152.69 (113.86)	9632 (42.84)	5.95 (9.57)	2210	2.3	0.482 (0.293)	14.50 (2.86)	0.017 (0.011)	209 (98)
<b>75% of Pull at Reduced Engine Speed—Auto mode</b>								
226.76 (169.09)	14427 (64.17)	5.89 (9.48)	1556	3.4	0.401 (0.244)	17.43 (3.43)	0.016 (0.010)	211 (99)
<b>50% of Pull at Reduced Engine Speed—Auto mode</b>								
152.37 (113.62)	9594 (42.68)	5.96 (9.59)	1385	2.2	0.418 (0.254)	16.71 (3.29)	0.016 (0.010)	208 (98)

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

**Dates of tests:** October 1 to 13, 2020

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

**CONSUMABLE Fluids, OIL and TIME: Fuel** No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8386 **Fuel weight** 6.982 lbs/gal (0.837 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** CK-4 **Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Front axle lubricant** John Deere Hy-Gard fluid **Total time engine was operated:** 22.5 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.** \*RG6090U086984\* **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 water separator **Fuel cooler** radiator for pump return fuel **Exhaust** DOC (diesel oxidation catalyst), SCR (selective catalyst reduction) and regenerative DPF (diesel particulate filter) integrated within a vertical muffler **Cooling medium temperature control** thermostat and variable speed fan

**ENGINE OPERATING PARAMETERS: Fuel rate:** 117.1 - 126.6 lb/h (53.1 - 57.4 kg/h) **High idle:** 2190 - 2210 rpm **Turbo boost:** nominal 25.4 - 28.3 psi (175 - 195 kPa) as measured 26.8 psi (185 kPa)

**CHASSIS: Type** front wheel assist with duals **Serial No.** \*1RW8370DVLC170202\* **Tread width** rear 60.0" (1524 mm) to 127.9" (3248 mm) front 60.0" (1524 mm) to 88.0" (2235 mm) **Wheelbase** 120.1" (3050 mm) **Hydraulic control system** direct engine drive **Transmission** infinitely variable with four mechanical ranges and automatic shifting between ranges **Nominal travel speeds mph (km/h)** forward - 0 - 26.1 mph, (0 - 42 km/h) reverse - 0 - 12.4 mph (0 - 20 km/h) **Clutch** a foot pedal controls the hydrostatic oil flow **Brakes** wet multiple disc hydraulically operated by two foot pedals that can be locked together **Steering** hydrostatic **Power take-off** 1000 rpm at 2000 engine rpm **Unladen tractor mass** 29000 lb (13154 kg)

**DRAWBAR PERFORMANCE**  
**UNBALLASTED - FRONT DRIVE ENGAGED**

**MANUAL MODE - 2100 ENGINE RPM**  
**DRAWBAR POWER AT SELECTED TRAVEL SPEED SETTINGS**

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)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3.7 mph (6.0 km/h)										
234.92 (175.18)	28178 (125.34)	3.13 (5.04)	2177	12.9	0.484 (0.294)	14.42 (2.84)	0.017 (0.010)	213 (100)	56 (13)	28.69 (97.16)
4.3 mph (7.0 km/h)										
262.25 (195.56)	27081 (120.56)	3.64 (5.85)	2107	10.4	0.455 (0.277)	15.35 (3.02)	0.017 (0.010)	212 (100)	58 (14)	28.72 (97.24)
4.7 mph (7.6 km/h)										
273.10 (203.65)	25316 (112.61)	4.05 (6.51)	2100	7.8	0.438 (0.266)	15.95 (3.14)	0.016 (0.010)	212 (100)	60 (16)	28.72 (97.26)
5.1 mph (8.2 km/h)										
277.30 (206.78)	23531 (104.67)	4.42 (7.11)	2100	6.6	0.431 (0.262)	16.19 (3.19)	0.016 (0.010)	212 (100)	63 (17)	28.74 (97.32)
5.6 mph (9.0 km/h)										
284.35 (212.04)	21549 (95.85)	4.95 (7.97)	2099	4.9	0.421 (0.256)	16.57 (3.26)	0.015 (0.009)	212 (100)	50 (10)	28.80 (97.53)
6.2 mph (10.0 km/h)										
284.85 (212.41)	19312 (85.90)	5.53 (8.90)	2099	4.7	0.420 (0.255)	16.63 (3.28)	0.014 (0.009)	211 (99)	55 (13)	28.81 (97.56)
6.8 mph (11.0 km/h)										
286.08 (213.33)	17550 (78.06)	6.11 (9.83)	2100	3.7	0.417 (0.254)	16.74 (3.30)	0.014 (0.009)	211 (99)	55 (13)	28.81 (97.56)
7.5 mph (12.0 km/h)										
284.76 (212.34)	15964 (71.01)	6.69 (10.77)	2100	3.3	0.419 (0.255)	16.67 (3.28)	0.015 (0.009)	212 (100)	58 (14)	28.81 (97.56)
8.1 mph (13.0 km/h)										
283.12 (211.12)	14607 (64.97)	7.27 (11.70)	2100	3.1	0.422 (0.257)	16.53 (3.26)	0.015 (0.009)	212 (100)	61 (16)	28.81 (97.56)
8.7 mph (14.0 km/h)										
280.52 (209.18)	13411 (59.65)	7.85 (12.63)	2099	2.8	0.425 (0.259)	16.42 (3.23)	0.016 (0.010)	213 (100)	65 (18)	28.81 (97.56)
9.3 mph (15.0 km/h)										
279.25 (208.23)	12435 (55.31)	8.42 (13.55)	2099	2.6	0.427 (0.260)	16.36 (3.22)	0.017 (0.010)	213 (101)	67 (19)	28.80 (97.53)

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load at 4.7 mph (7.6 km/h) engine speed - 2200 rpm	65.4	65.4
At no load at 4.7 mph (7.6 km/h) Auto mode - engine speed - 1200 rpm	61.8	61.8
At no load at 4.7 mph (7.6 km/h) Custom mode - engine speed - 900 rpm	58.1	57.9
Transport speed - no load - manual mode		70.1
Transport speed - no load - Auto mode		67.7
Transport speed - no load - Custom mode		67.8
Bystander		84.1

Horizontal distance of drawbar hitch point behind rear wheel axis - 48.7" (1237 mm)

**TIRES 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 480/80R50;\*\*\*;11(75)  
Two 420/85R34;\*\*\*;26 (180)  
21.0 in (535 mm)  
17020 lb (7720 kg)  
12155 lb (5513 kg)  
29175 lb (13233 kg)

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

**NOTE 1:** The manufacturer declares that the average time between active regenerations is 40 hours. A 1% power decrease 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. 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. **2223**, Nebraska Summary 1170, March 3, 2021.

Roger M. Hoy  
Director

M.F. Kocher  
P.J. Jasa  
J.D. Luck  
Board of Tractor Test Engineers

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

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)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp.°F(°C) cool- ing dry med bulb	Air dry bulb	Barom. inch Hg (kPa)
3.5 mph (5.6 km/h)										
227.11 (169.35)	27768 (123.52)	3.07 (4.94)	1610	11.8	0.438 (0.266)	15.95 (3.14)	0.016 (0.010)	212 (100)	57 (14)	28.71 (97.21)
4.0 mph (6.4 km/h)										
255.75 (190.71)	26740 (118.95)	3.59 (5.78)	1697	9.8	0.422 (0.257)	16.53 (3.26)	0.018 (0.011)	211 (99)	59 (15)	28.72 (97.26)
4.3 mph (7.0 km/h)										
272.07 (202.88)	25560 (113.70)	4.00 (6.43)	1755	8.3	0.420 (0.256)	16.61 (3.27)	0.018 (0.011)	212 (100)	62 (16)	28.73 (97.29)
4.7 mph (7.6 km/h)										
277.35 (206.82)	23660 (105.24)	4.40 (7.07)	1768	6.9	0.414 (0.252)	16.87 (3.32)	0.017 (0.011)	212 (100)	65 (18)	28.75 (97.36)
5.2 mph (8.4 km/h)										
284.28 (211.98)	21461 (95.46)	4.97 (8.00)	1804	4.9	0.406 (0.247)	17.19 (3.39)	0.016 (0.010)	211 (99)	53 (11)	28.80 (97.53)
5.8 mph (9.4 km/h)										
284.22 (211.94)	19045 (84.71)	5.60 (9.01)	1770	4.6	0.402 (0.245)	17.36 (3.42)	0.015 (0.009)	211 (99)	55 (13)	28.81 (97.56)
6.3 mph (10.2 km/h)										
285.27 (212.73)	17546 (78.05)	6.10 (9.82)	1779	3.8	0.404 (0.246)	17.30 (3.41)	0.016 (0.009)	211 (99)	57 (14)	28.81 (97.56)
7.0 mph (11.2 km/h)										
284.53 (212.17)	15873 (70.61)	6.72 (10.81)	1792	3.4	0.409 (0.249)	17.07 (3.36)	0.016 (0.010)	212 (100)	60 (15)	28.81 (97.56)
7.6 mph (12.2 km/h)										
283.80 (211.63)	14492 (64.46)	7.34 (11.81)	1792	3.1	0.406 (0.247)	17.20 (3.39)	0.016 (0.010)	212 (100)	63 (17)	28.81 (97.56)
8.1 mph (13.0 km/h)										
280.68 (209.30)	13425 (59.72)	7.84 (12.62)	1788	2.9	0.410 (0.249)	17.05 (3.36)	0.017 (0.011)	212 (100)	66 (19)	28.81 (97.56)
8.7 mph (14.0 km/h)										
279.49 (208.42)	12384 (55.09)	8.46 (13.62)	1819	2.6	0.408 (0.248)	17.10 (3.37)	0.018 (0.011)	212 (100)	68 (20)	28.80 (97.53)

**DRAWBAR PERFORMANCE  
UNBALLASTED - FRONT DRIVE ENGAGED  
MANUAL MODE - 1750 ENGINE RPM**

**MAXIMUM POWER AT SELECTED TRAVEL SPEED SETTINGS**

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)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3.7 mph (6.0 km/h)										
234.68 (175.00)	28117 (125.07)	3.13 (5.04)	2179	12.9	0.484 (0.295)	14.41 (2.84)	0.016 (0.010)	213 (100)	56 (13)	28.69 (97.16)
4.3 mph (7.0 km/h)										
262.47 (195.72)	27041 (120.28)	3.64 (5.86)	2108	10.2	0.452 (0.275)	15.45 (3.04)	0.016 (0.010)	212 (100)	58 (14)	28.72 (97.24)
4.7 mph (7.6 km/h)										
275.15 (205.18)	26049 (115.87)	3.97 (6.38)	2077	8.7	0.441 (0.268)	15.83 (3.12)	0.017 (0.010)	212 (100)	60 (16)	28.72 (97.26)
5.1 mph (8.2 km/h)										
284.96 (212.49)	25085 (111.58)	4.26 (6.86)	2051	7.9	0.433 (0.264)	16.11 (3.17)	0.017 (0.010)	213 (101)	64 (18)	28.74 (97.32)
5.6 mph (9.0 km/h)										
301.02 (224.47)	24768 (110.17)	4.56 (7.34)	1983	7.3	0.423 (0.257)	16.50 (3.25)	0.017 (0.010)	214 (101)	66 (19)	28.83 (97.63)
6.2 mph (10.0 km/h)										
314.23 (234.32)	24513 (109.04)	4.81 (7.74)	1872	6.6	0.415 (0.252)	16.84 (3.32)	0.015 (0.009)	213 (101)	55 (13)	28.84 (97.66)
6.8 mph (11.0 km/h)										
320.08 (241.88)	23127 (98.17)	5.19 (8.87)	1823	6.4	0.409 (0.256)	17.07 (3.30)	0.016 (0.007)	213 (102)	55 (19)	28.84 (97.56)
7.5 mph (12.0 km/h)										
321.50 (239.74)	22092 (98.27)	5.46 (8.79)	1750	6.1	0.406 (0.247)	17.21 (3.39)	0.017 (0.010)	213 (101)	56 (13)	28.84 (97.66)
8.1 mph (13.0 km/h)										
322.60 (240.56)	20319 (90.38)	5.95 (9.58)	1750	4.8	0.404 (0.246)	17.29 (3.41)	0.017 (0.010)	213 (100)	57 (14)	28.84 (97.66)
8.7 mph (14.0 km/h)										
323.13 (240.96)	18799 (83.62)	6.45 (10.38)	1750	4.3	0.404 (0.246)	17.27 (3.40)	0.018 (0.011)	213 (101)	60 (15)	28.84 (97.66)
9.3 mph (15.0 km/h)										
324.32 (241.85)	17549 (78.06)	6.94 (11.16)	1749	4.1	0.403 (0.245)	17.33 (3.41)	0.017 (0.011)	213 (101)	61 (16)	28.84 (97.66)
9.9 mph (16.0 km/h)										
321.83 (239.98)	16265 (72.35)	7.42 (11.94)	1750	3.6	0.404 (0.246)	17.28 (3.40)	0.017 (0.010)	213 (101)	63 (17)	28.84 (97.66)
10.6 mph (17.0 km/h)										
321.82 (239.98)	15286 (67.99)	7.90 (12.71)	1749	3.4	0.404 (0.246)	17.28 (3.40)	0.017 (0.010)	213 (101)	64 (18)	28.84 (97.66)
11.2 mph (18.0 km/h)										
321.17 (239.50)	14365 (63.90)	8.38 (13.49)	1750	3.1	0.404 (0.246)	17.27 (3.40)	0.017 (0.011)	214 (101)	64 (18)	28.84 (97.66)

## HYDRAULIC PERFORMANCE

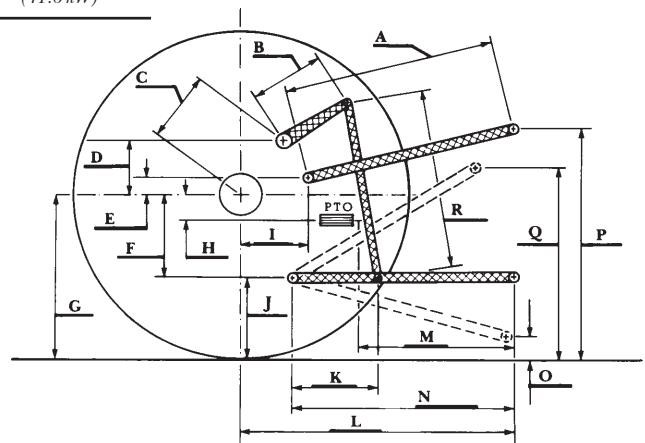
CATEGORY: IVN  
Quick Attach: Yes  
OECD Static test

	<u>Lift cylinders</u>	
Maximum force exerted through whole range:	20254 lbs (90.1 kN) 2x115 mm	15229 lbs (67.7 kN) 2x100 mm
	<u>85 cc pump</u>	<u>85 cc and 35cc pumps combined</u>
i) Sustained pressure at compensator cutoff:	2930 psi (202 bar)	2941 psi (203 bar)
	<u>three outlet sets combined</u>	
ii) Pump delivery rate at minimum pressure and rated engine speed:	60.2 GPM(227.8 l/min)	84.2 GPM(318.7 l/min)
iii) Pump delivery rate at maximum hydraulic power:	60.9 GPM(230.6 l/min)	80.0 GPM(302.9 l/min)
Delivery pressure:	2525 psi (172 bar)	2114 psi (146 bar)
Power:	89.8 HP (66.9 kW)	98.7 HP (73.6 kW)
	<u>single outlet set</u>	
ii) Pump delivery rate at minimum pressure and rated engine speed:	<u>1/2" couplers</u> 36.4 GPM(137.8 l/min)	<u>3/4" couplers</u> 42.9 GPM(162.5 l/min)
iii) Pump delivery rate at maximum hydraulic power:	34.4 GPM(130.3 l/min)	41.5 GPM(157.2 l/min)
Delivery pressure:	2404 psi (166 bar)	2301 psi (159 bar)
Power:	48.3 HP (36.0 kW)	55.8 HP (41.6 kW)

## HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	28.5	725
B	20.5	520
C	20.9	532
D	18.9	480
E	12.0	304
F	14.4	365
G	38.2	970
H	9.1	230
I	23.6	599
J	23.8	605
K	28.7	730
L	52.8	1340
*L'	58.7	1490
M	25.9	657
N	40.1	1019
O	9.1	230
P	50.1	1272
Q	41.5	1055
R	45.7	1160

\*L' to Quick Attach ends



### RECOMMENDED CITATION FORMAT:

NTTL.(2021). Nebraska OECD tractor test 2223 for John Deere 8R 370 IVT Diesel.  
Lincoln, NE:Nebraska Tractor Test Laboratory. Retrieved from <http://tractortestlab.unl.edu>



**JOHN DEERE 8R 370 DIESEL**