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2020

## Test 2227: John Deere 8RX 370

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

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# NEBRASKA OECD TRACTOR TEST 2227-SUMMARY 1174

## JOHN DEERE 8RX 370 DIESEL

### e23 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—1053 rpm)</b>						
341.49 (254.65)	2101	17.45 (66.04)	0.357 (0.217)	19.57 (3.86)	0.51 (1.92)	Fuel used during active exhaust regeneration-0.79 gal (3.00l) (see note 1, p.2)
<b>Standard Power Take-off Speed(1000 rpm)</b>						
368.00 (274.42)	1995	18.60 (70.41)	0.353 (0.215)	19.79 (3.90)	0.56 (2.11)	
<b>Maximum Power (1 hour)</b>						
385.12 (287.18)	1802	19.04 (72.06)	0.345 (0.210)	20.23 (3.99)	0.55 (2.09)	

#### VARYING POWER AND FUEL CONSUMPTION

341.49 (254.65)	2101	17.45 (66.04)	0.357 (0.217)	19.57 (3.86)	0.51 (1.92)	Air temperature
297.65 (221.96)	2155	15.58 (58.97)	0.365 (0.222)	19.11 (3.76)	0.45 (1.69)	73°F (23°C)
222.60 (167.49)	2166	12.24 (46.34)	0.381 (0.231)	18.35 (3.61)	0.33 (1.27)	Relative humidity
150.47 (112.20)	2179	9.09 (34.39)	0.422 (0.256)	16.56 (3.26)	0.27 (1.01)	38%
75.64 (56.40)	2188	6.33 (23.95)	0.584 (0.355)	11.95 (2.35)	0.14 (0.53)	Barometer
1.67 (1.24)	2200	4.32 (16.35)	18.070 (10.992)	0.39 (0.08)	0.01 (0.03)	28.73" Hg (97.28 kPa)

Maximum Torque - 1244 lb.-ft. (1686 Nm) at 1550 rpm

Maximum Torque Rise - 45.7%

Torque rise at 1681 engine rpm - 41%

Power increase at 1802 engine rpm - 12.8%

#### 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)	Hp.hr/gal (kW.h/l)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing dry med bulb	Barom. inch Hg (kPa)	
<b>Power at Rated Engine Speed—9th Gear-Manual mode</b>										
284.22 (211.94)	24969 (111.07)	4.27 (6.87)	2100	4.8	0.428 (0.260)	16.31 (3.21)	0.016 (0.010)	212 (100)	54 (12)	28.77 (97.43)
<b>75% of Pull at Rated Engine Speed—9th Gear-Manual mode</b>										
223.94 (166.99)	18734 (83.33)	4.48 (7.21)	2159	2.7	0.443 (0.269)	15.77 (3.11)	0.016 (0.010)	211 (99)	64 (18)	28.76 (97.39)
<b>50% of Pull at Rated Engine Speed—9th Gear-Manual mode</b>										
152.27 (113.55)	12485 (55.53)	4.57 (7.35)	2172	1.4	0.480 (0.292)	14.56 (2.87)	0.019 (0.011)	209 (98)	64 (18)	28.76 (97.39)
<b>75% of Pull at Reduced Engine Speed—4.6 mph (7.4 km/h) Auto mode</b>										
223.84 (166.91)	18675 (83.07)	4.50 (7.23)	1391	2.7	0.401 (0.244)	17.40 (3.43)	0.015 (0.009)	209 (98)	65 (18)	28.75 (97.36)
<b>50% of Pull at Reduced Engine Speed—4.6 mph (7.4 km/h) Auto mode</b>										
151.98 (113.33)	12500 (55.60)	4.56 (7.34)	1391	1.3	0.426 (0.259)	16.40 (3.23)	0.017 (0.010)	208 (98)	65 (18)	28.75 (97.34)

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

**Dates of tests:** October 6 - 15, 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:** 23.5 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.** \*RG6090U089214\* **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 26.1 - 29.0 psi (180 - 200 kPa) as measured 27.1 psi (187 kPa)

**CHASSIS: Type** front wheel assist with rubber tracks **Serial No.** \*1RW8370DCLK801253\* **Tread width** rear 88.0" (2235 mm) front 88.0" (2235 mm) **Wheelbase** 127.4" (3235 mm) **Length of track on ground** front 58.8" (1490 mm), rear 71.5" (1815 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range power shift **Nominal travel speeds mph (km/h)** first 1.38 (2.22) second 1.60 (2.58) third 1.85 (2.98) fourth 2.15 (3.46) fifth 2.49 (4.01) sixth 2.89 (4.65) seventh 3.31 (5.34) eighth 3.86 (6.21) ninth 4.46 (7.18) tenth 5.16 (8.31) eleventh 6.00 (9.65) twelfth 6.94 (11.17) thirteenth 8.06 (12.97)

**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)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)	
					6th Gear					
241.71 (180.24)	35670 (158.67)	2.55 (4.10)	2148	14.6	0.486 (0.295)	14.38 (2.83)	0.018 (0.011)	213 (100)	48 (9)	28.72 (97.26)
					7th Gear					
263.29 (196.34)	32507 (144.60)	3.04 (4.89)	2122	10.1	0.455 (0.277)	15.33 (3.02)	0.017 (0.010)	212 (100)	51 (10)	28.74 (97.32)
					8th Gear					
280.29 (209.01)	29192 (129.85)	3.60 (5.79)	2100	7.2	0.436 (0.265)	16.01 (3.15)	0.015 (0.009)	210 (99)	52 (11)	28.75 (97.36)
					9th Gear					
284.22 (211.94)	24969 (111.07)	4.27 (6.87)	2100	4.8	0.428 (0.260)	16.31 (3.21)	0.016 (0.010)	212 (100)	54 (12)	28.77 (97.43)
					10th Gear					
284.45 (212.11)	21283 (94.67)	5.01 (8.06)	2100	3.5	0.428 (0.260)	16.30 (3.21)	0.016 (0.010)	212 (100)	56 (13)	28.78 (97.46)
					11th Gear					
285.38 (212.81)	18193 (80.93)	5.88 (9.46)	2099	2.3	0.427 (0.260)	16.34 (3.22)	0.016 (0.009)	212 (100)	56 (13)	28.84 (97.66)
					12th Gear					
284.11 (211.86)	15552 (69.18)	6.85 (11.02)	2100	1.8	0.431 (0.262)	16.22 (3.19)	0.016 (0.009)	213 (100)	58 (14)	28.86 (97.73)
					13th Gear					
282.52 (210.67)	13272 (59.04)	7.98 (12.84)	2099	1.3	0.430 (0.262)	16.22 (3.20)	0.015 (0.009)	211 (99)	52 (11)	28.82 (97.60)
					14th Gear					
275.71 (205.59)	11245 (50.02)	9.20 (14.80)	2100	1.1	0.444 (0.270)	15.71 (3.10)	0.016 (0.009)	211 (99)	54 (12)	28.83 (97.63)

fourteenth 9.25 (14.89) fifteenth 10.74 (17.29)  
 sixteenth 12.24 (19.70) seventeenth 14.21 (22.87)  
 eighteenth 16.47 (26.50) nineteenth 19.11 (30.76)  
 twentieth 22.12 (35.60) twenty-first 25.68 (41.33)  
 twenty-second 26.10 (42.00) twenty-third 26.10  
 (42.00) electronically limited reverse 1.66 (2.67),  
 2.23 (3.59), 3.00 (4.82), 4.00 (6.43), 4.62 (7.44),  
 6.21 (10.00), 8.35 (13.44), 11.14 (17.92), 14.73  
 (23.71), 18.64 (30.00), 18.64 (30.00) electronically  
 limited **Clutch** wet multiple disc hydraulically  
 actuated by foot pedal **Brakes** wet multiple disc  
 hydraulically operated by two foot pedals that can  
 be locked together **Steering** hydrostatic **Power  
 take-off** 1000 rpm at 1995 engine rpm **Unladen  
 tractor mass** 42385 lb (19225 kg)

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

**NOTE 1:** The manufacturer declares that the average time between active regenerations is 40 hours. A 2% 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. **2227**, Nebraska Summary 1174, May 25, 2021.

Roger M. Hoy  
 Director

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

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 9th gear	65.6	65.6
Transport speed-no load- 21st gear		69.0
Bystander in 21st gear		84.9

Horizontal distance of drawbar hitch point behind rear wheel axis - 56.8"(1442 mm)

**TRACKS AND WEIGHT**

**Rear tracks** - no & size  
**Front tracks** - no & size  
**Height of drawbar**  
**Static weight with operator- Rear**  
 - Front  
 - Total

**Tested Without Ballast**

2 x 18.0 in (457 mm)  
 2 x 18.0 in (457 mm)  
 22.5 in (570 mm)  
 24520 lb (11122 kg)  
 18040 lb (8183 kg)  
 42560 lb (19305 kg)

**DRAWBAR PERFORMANCE**  
**UNBALLASTED - FRONT DRIVE ENGAGED - AUTO MODE**  
**(Loads based on 2100 engine rpm manual mode performance runs)**

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)
3.9 mph (6.2 km/h)										
280.08 (208.85)	29248 (130.10)	3.59 (5.78)	1815	7.3	0.424 (0.258)	16.47 (3.24)	0.017 (0.010)	212 (100)	54 (12)	28.77 (97.43)
4.5 mph (7.2 km/h)										
284.20 (211.93)	24918 (110.84)	4.28 (6.88)	1818	4.9	0.416 (0.253)	16.77 (3.30)	0.016 (0.010)	210 (99)	55 (13)	28.78 (97.44)
5.2 mph (8.4 km/hr)										
284.50 (212.15)	21052 (93.64)	5.07 (8.15)	1827	3.4	0.415 (0.253)	16.81 (3.31)	0.018 (0.011)	211 (99)	60 (16)	28.78 (97.46)
6.0 mph (9.6 km/h)										
284.56 (212.20)	18236 (81.12)	5.85 (9.41)	1805	2.5	0.409 (0.248)	17.09 (3.37)	0.016 (0.010)	211 (99)	58 (14)	28.85 (97.70)
7.0 mph (11.2 km/h)										
284.32 (212.01)	15516 (69.02)	6.87 (11.06)	1814	1.8	0.413 (0.251)	16.90 (3.33)	0.016 (0.010)	211 (99)	59 (15)	28.87 (97.77)
8.1 mph (13.0 km/h)										
282.66 (210.78)	13245 (58.87)	8.00 (12.87)	1833	1.4	0.421 (0.256)	16.60 (3.27)	0.017 (0.010)	212 (100)	53 (12)	28.82 (97.60)
9.2 mph (14.8 km/h)										
275.09 (205.13)	11279 (50.17)	9.15 (14.73)	1798	1.0	0.432 (0.263)	16.17 (3.19)	0.017 (0.011)	212 (100)	55 (13)	28.84 (97.66)

**DRAWBAR PERFORMANCE**  
**UNBALLASTED - FRONT DRIVE ENGAGED**  
**MANUAL MODE - 1800 ENGINE RPM**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Consumption 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)
6th Gear										
242.09 (180.52)	35648 (158.57)	2.55 (4.10)	2150	14.5	0.485 (0.295)	14.39 (2.84)	0.018 (0.011)	212 (100)	49 (9)	28.72 (97.24)
7th Gear										
264.80 (197.46)	32695 (145.43)	3.04 (4.89)	2125	10.2	0.454 (0.276)	15.39 (3.03)	0.016 (0.010)	211 (99)	50 (10)	28.74 (97.32)
8th Gear										
285.42 (212.84)	31244 (138.98)	3.43 (5.51)	2036	8.9	0.443 (0.270)	15.76 (3.10)	0.016 (0.010)	212 (100)	52 (11)	28.76 (97.39)
9th Gear										
301.40 (224.75)	29113 (129.50)	3.89 (6.25)	1962	7.4	0.433 (0.263)	16.13 (3.18)	0.015 (0.009)	213 (100)	55 (13)	28.77 (97.43)
10th Gear										
308.20 (229.82)	27795 (123.64)	4.16 (6.69)	1800	6.6	0.428 (0.260)	16.32 (3.21)	0.016 (0.010)	214 (101)	57 (14)	28.78 (97.46)
11th Gear										
314.50 (234.52)	23929 (106.44)	4.93 (7.93)	1800	4.5	0.420 (0.256)	16.62 (3.27)	0.017 (0.010)	213 (101)	60 (16)	28.78 (97.44)
12th Gear										
318.61 (237.59)	20678 (91.98)	5.78 (9.30)	1800	3.3	0.415 (0.252)	16.84 (3.32)	0.016 (0.010)	213 (101)	61 (16)	28.77 (97.43)
13th Gear										
319.96 (238.97)	17714 (78.79)	6.77 (10.90)	1800	2.4	0.412 (0.251)	16.93 (3.33)	0.017 (0.010)	213 (100)	62 (17)	28.77 (97.43)
14th Gear										
314.38 (234.43)	15054 (66.96)	7.84 (12.61)	1801	1.8	0.419 (0.255)	16.65 (3.28)	0.016 (0.010)	214 (101)	62 (17)	28.77 (97.43)
15th Gear										
309.22 (230.58)	12699 (56.49)	9.13 (14.69)	1800	1.3	0.428 (0.260)	16.31 (3.21)	0.017 (0.010)	214 (101)	64 (18)	28.77 (97.43)

## HYDRAULIC PERFORMANCE

CATEGORY: IVN  
Quick Attach: Yes  
OECD Static test

	<u>Lift cylinders</u>	
Maximum force exerted through whole range:	20235 lbs (90.0 kN)	2x115 mm
	15248 lbs (67.8 kN)	2x100 mm
	<u>85 cc pump    85 cc and 35cc pumps combined</u>	
i) Sustained pressure at compensator cutoff:	2884 psi (199 bar)	2941 psi (203 bar)
	<u>three outlet sets combined</u>	
ii) Pump delivery rate at minimum pressure and rated engine speed:	61.0 GPM (230.9 l/min)	84.2 GPM (318.7 l/min)
iii) Pump delivery rate at maximum hydraulic power:	61.0 GPM (230.9 l/min)	80.0 GPM (302.9 l/min)
Delivery pressure:	2446 psi (169 bar)	2114 psi (146 bar)
Power:	87.1 HP (59.4 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> 37.9 GPM (143.3 l/min)	<u>3/4" couplers</u> 42.9 GPM (162.5 l/min)
iii) Pump delivery rate at maximum hydraulic power:	35.9 GPM (135.8 l/min)	41.5 GPM (157.2 l/min)
Delivery pressure:	2315 psi (160 bar)	2301 psi (159 bar)
Power:	48.4 HP (36.1 kW)	55.8 HP (41.6 kW)

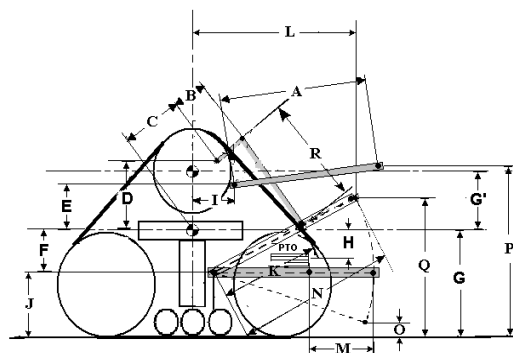
## HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	27.4	695
B	20.5	520
C	33.3	847
D	28.8	732
E	21.4	544
F	4.5	113
G	29.2	741
*G'	16.4	417
*H	2.0	52
I	31.3	796
J	24.7	628
K	28.9	735
L	59.8	1520
*L'	66.5	1690
M	25.9	657
N	42.9	1090
O	9.1	230
P	51.7	1313
Q	43.3	1100
R	46.3	1175

\*G' to undercarriage pivot point

\*H PTO is above undercarriage pivot point

\*L' to Quick Attach ends



## RECOMMENDED CITATION FORMAT:

NTTL.(2021). Nebraska OECD tractor test 2227 for John Deere 8RX 370 e23 Diesel. Lincoln, NE:Nebraska Tractor Test Laboratory. Retrieved from <http://tractortestlab.unl.edu>



**JOHN DEERE 8RX 370 DIESEL**