2021

Test 2233: John Deere 8R 310

Nebraska Tractor Test Lab

NEBRASKA OECD TRACTOR TEST 2233–SUMMARY 1185
JOHN DEERE 8R 310 DIESEL
e23 TRANSMISSION

POWER TAKE-OFF PERFORMANCE

Power HP *(kW)*	Crank shaft speed rpm	Diesel Consumption Gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	D.E.F. Consumption Hp.hr/gal *(kW.h/l)*	D.E.F. Consumption Gal/hr *(l/h)*	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION						
Rated Engine Speed—(PTO speed—1052 rpm)						
280.01 *(208.80)*	2101	14.48 *(54.79)*	0.362 *(0.220)*	19.34 *(3.81)*	0.63 *(2.38)*	Fuel used during active exhaust regeneration-1.19 gal *(4.52 l)* (see note 1, p.2)
Standard Power Take-off Speed(1000 rpm)						
303.47 *(226.30)*	1995	15.35 *(58.10)*	0.354 *(0.215)*	19.77 *(3.90)*	0.67 *(2.54)*	
Maximum Power (1 hour)						
318.37 *(237.41)*	1700	15.51 *(58.72)*	0.341 *(0.207)*	20.52 *(4.04)*	0.59 *(2.25)*	
VARYING POWER AND FUEL CONSUMPTION						
280.01 *(208.80)*	2101	14.48 *(54.79)*	0.362 *(0.220)*	19.34 *(3.81)*	0.63 *(2.38)*	Air temperature
244.11 *(182.03)*	2155	12.94 *(48.99)*	0.371 *(0.226)*	18.86 *(3.72)*	0.57 *(2.15)*	72°F *(22°C)*
183.86 *(137.11)*	2165	10.42 *(39.44)*	0.397 *(0.241)*	17.65 *(3.48)*	0.45 *(1.70)*	Relative humidity
123.47 *(92.07)*	2177	8.02 *(30.37)*	0.455 *(0.277)*	15.39 *(3.03)*	0.26 *(0.97)*	12%
61.70 *(46.01)*	2188	5.78 *(21.88)*	0.656 *(0.399)*	10.67 *(2.10)*	0.15 *(0.56)*	Barometer
1.26 *(0.94)*	2199	4.29 *(16.23)*	23.821 *(14.490)*	0.29 *(0.06)*	0.18 *(0.68)*	29.24" Hg *(99.02 kPa)*

Maximum Torque - 1051 lb.-ft. *(1424 Nm)* at 1550 rpm
Maximum Torque Rise - 50.1%
Torque rise at 1680 engine rpm - 43%
Power increase at 1700 engine rpm - 13.7%

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)*	Fuel 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)*
Power at Rated Engine Speed—9th Gear-Manual mode										
249.75 *(186.23)*	20434 *(90.89)*	4.58 *(7.37)*	2100	4.4	0.408 *(0.248)*	17.16 *(3.38)*	0.018 *(0.011)*	210 *(99)*	62 *(17)*	28.52 *(96.58)*
75% of Pull at Rated Engine Speed—9th Gear-Manual mode										
195.24 *(145.59)*	15359 *(68.32)*	4.77 *(7.68)*	2158	3.2	0.427 *(0.260)*	16.37 *(3.23)*	0.020 *(0.012)*	208 *(98)*	73 *(23)*	28.49 *(96.48)*
50% of Pull at Rated Engine Speed—9th Gear-Manual mode										
132.18 *(98.56)*	10215 *(45.44)*	4.85 *(7.81)*	2171	2.0	0.484 *(0.295)*	14.45 *(2.85)*	0.020 *(0.012)*	207 *(97)*	73 *(23)*	28.49 *(96.48)*
75% of Pull at Reduced Engine Speed—5.0 mph *(8.0 km/h)* Auto mode										
195.13 *(145.51)*	15446 *(68.70)*	4.74 *(7.63)*	1378	3.1	0.383 *(0.233)*	18.26 *(3.60)*	0.015 *(0.009)*	207 *(97)*	74 *(23)*	28.48 *(96.44)*
50% of Pull at Reduced Engine Speed—5.1 mph *(8.2 km/h)* Auto mode										
132.09 *(98.50)*	10084 *(44.86)*	4.91 *(7.90)*	1412	2.0	0.410 *(0.250)*	17.06 *(3.36)*	0.013 *(0.008)*	206 *(96)*	74 *(23)*	28.48 *(96.44)*

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

Dates of tests: April 1 - 15, 2021

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)*** 0.8404 **Fuel weight** 6.998 lbs/gal *(0.839 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:** 20.5 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger, air to air aftercooler and D.E.F (diesel exhaust fluid) exhaust treatment **Serial No.** *RG6090U093869* **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: 96.3 - 103.8 lb/h *(43.7 - 47.2 kg/h)* **High idle:** 2190 - 2210 rpm **Turbo boost:** nominal 22.4 - 25.4 psi *(155 - 175 kPa)* as measured 24.2 psi *(167 kPa)*

CHASSIS: Type front wheel assist with duals **Serial No.***1RW8310DALB180054* **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** selective gear fixed ratio with full range operator controlled power shift **Nominal travel speeds mph*(km/h)*** first 1.49 *(2.40)* second 1.73 *(2.78)* third 2.00 *(3.22)* fourth 2.32 *(3.74)* fifth 2.69 *(4.33)* sixth 3.12 *(5.03)* seventh 3.59 *(5.77)* eighth 4.16 *(6.70)* ninth 4.82 *(7.75)* tenth 5.58 *(8.98)* eleventh 6.47 *(10.42)* twelfth 7.49 *(12.06)* thirteenth 8.70 *(14.00)* fourteenth 9.99 *(16.08)* fifteenth 11.60 *(18.67)* sixteenth 13.22 *(21.27)*

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED
MANUAL MODE - 2100 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)*	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					
209.05	28288	2.78	2152	13.0	0.456	15.36	0.023	209	48	28.40
(155.89)	*(125.83)*	*(4.47)*			*(0.277)*	*(3.03)*	*(0.014)*	*(98)*	*(9)*	*(96.16)*
					7th Gear					
229.05	26073	3.30	2130	8.9	0.435	16.07	0.021	210	48	28.39
(170.80)	*(115.98)*	*(5.30)*			*(0.265)*	*(3.17)*	*(0.013)*	*(99)*	*(9)*	*(96.14)*
					8th Gear					
244.45	23591	3.89	2100	6.2	0.417	16.80	0.020	209	47	28.39
(182.29)	*(104.94)*	*(6.25)*			*(0.253)*	*(3.31)*	*(0.012)*	*(98)*	*(8)*	*(96.14)*
					9th Gear					
249.75	20434	4.58	2100	4.4	0.408	17.16	0.018	210	62	28.52
(186.23)	*(90.89)*	*(7.37)*			*(0.248)*	*(3.38)*	*(0.011)*	*(99)*	*(17)*	*(96.58)*
					10th Gear					
247.93	17367	5.35	2100	3.6	0.410	17.05	0.019	209	62	28.52
(184.88)	*(77.25)*	*(8.61)*			*(0.250)*	*(3.36)*	*(0.011)*	*(98)*	*(17)*	*(96.58)*
					11th Gear					
247.00	14813	6.25	2100	3.0	0.408	17.16	0.019	209	64	28.51
(184.19)	*(65.89)*	*(10.06)*			*(0.248)*	*(3.38)*	*(0.011)*	*(98)*	*(18)*	*(96.55)*
					12th Gear					
244.95	12641	7.27	2100	2.6	0.411	17.02	0.020	210	66	28.50
(182.66)	*(56.23)*	*(11.70)*			*(0.250)*	*(3.35)*	*(0.012)*	*(99)*	*(19)*	*(96.51)*
					13th Gear					
246.73	10929	8.47	2100	2.1	0.408	17.14	0.019	209	69	28.50
(183.98)	*(48.61)*	*(13.62)*			*(0.248)*	*(3.38)*	*(0.012)*	*(98)*	*(21)*	*(96.51)*

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive Engaged dB(A)	Disengaged dB(A)
At no load in 9th gear	66.7	66.7
Transport speed - no load - 20th gear		67.9
Bystander in 20th gear		84.4

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

TIRES AND WEIGHT — **Tested Without Ballast**

Rear Tires - No., size, ply & psi(*kPa*)	Four 480/80R50;***;11(*75*)
Front Tires - No., size, ply & psi(*kPa*)	Two 420/85R34;***;29(*200*)
Height of Drawbar	20.5 in (*520 mm*)
Static Weight with operator - Rear	16645 lb (*7550 kg*)
- Front	12470 lb (*5656 kg*)
- Total	29115 lb(*13206 kg*)

seventeenth 15.35 *(24.70)* eighteenth 17.78 *(28.61)* nineteenth 20.64 *(33.22)* twentieth 23.89 *(38.44)* twenty-first 26.10 *(42.00)* twenty-second 26.10 *(42.00)* twenty-third 26.10 *(42.00)* (electronically limited) reverse 1.79 *(2.88)*, 2.41 *(3.88)*, 3.24 *(5.21)*, 4.32 *(6.95)*, 4.99 *(8.03)*, 6.71 *(10.80)*, 9.02 *(14.51)*, 12.02 *(19.35)*, 15.91 *(25.60)*, 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** 28940 lb *(13127 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.

NOTE 2: The John Deere 8R 310 T.E.C.U. (Tractor Electronic Control Unit) is compliant with ISOBUS 11783.

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. **2233**, Nebraska Summary 1185, October 19, 2021.

Roger M. Hoy
Director

P.J. Jasa
J.D. Luck
S. Pitla
Board of Tractor Test Engineers

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)*
				3.6 mph *(5.8 km/h)*						
224.61	25850	3.26	1556	8.1	0.395	17.71	0.018	208	47	28.39
(167.49)	*(114.99)*	*(5.24)*			*(0.240)*	*(3.49)*	*(0.011)*	*(98)*	*(8)*	*(96.14)*
				4.2 mph *(6.8 km/h)*						
244.59	23458	3.91	1573	6.0	0.389	18.00	0.019	208	47	28.39
(182.39)	*(104.34)*	*(6.29)*			*(0.237)*	*(3.54)*	*(0.011)*	*(98)*	*(8)*	*(96.12)*
				4.8 mph *(7.8 km/h)*						
249.50	20515	4.56	1555	4.4	0.386	18.12	0.018	210	62	28.52
(186.05)	*(91.25)*	*(7.34)*			*(0.235)*	*(3.57)*	*(0.011)*	*(99)*	*(17)*	*(96.58)*
				5.6 mph *(9.0 km/h)*						
246.40	17411	5.31	1550	3.6	0.384	18.23	0.018	209	64	28.51
(183.74)	*(77.45)*	*(8.55)*			*(0.234)*	*(3.59)*	*(0.011)*	*(98)*	*(18)*	*(96.55)*
				6.6 mph *(10.6 km/h)*						
245.61	14622	6.30	1574	2.9	0.378	18.52	0.018	209	65	28.51
(183.15)	*(65.04)*	*(10.14)*			*(0.230)*	*(3.65)*	*(0.011)*	*(98)*	*(18)*	*(96.53)*
				7.6 mph *(12.2 km/h)*						
245.12	12641	7.27	1576	2.5	0.383	18.28	0.017	209	70	28.49
(182.79)	*(56.23)*	*(11.70)*			*(0.233)*	*(3.60)*	*(0.011)*	*(98)*	*(21)*	*(96.48)*
				8.8 mph *(14.2 km/h)*						
246.64	10887	8.50	1580	2.1	0.377	18.58	0.015	208	70	28.49
(183.92)	*(48.43)*	*(13.68)*			*(0.229)*	*(3.66)*	*(0.009)*	*(98)*	*(21)*	*(96.48)*

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED
MANUAL MODE - 1700 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)*	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					
208.40 *(155.40)*	28195 *(125.42)*	2.78 *(4.47)*	2152	13.0	0.458 *(0.279)*	15.27 *(3.01)*	0.024 *(0.014)*	210 *(99)*	48 *(9)*	28.40 *(96.16)*
					7th Gear					
229.39 *(171.06)*	26132 *(116.24)*	3.30 *(5.30)*	2131	9.1	0.433 *(0.264)*	16.15 *(3.18)*	0.020 *(0.012)*	209 *(98)*	47 *(8)*	28.39 *(96.14)*
					8th Gear					
250.50 *(186.80)*	25201 *(112.10)*	3.73 *(6.00)*	2042	7.4	0.418 *(0.255)*	16.72 *(3.29)*	0.020 *(0.012)*	210 *(99)*	47 *(8)*	28.38 *(96.11)*
					9th Gear					
267.72 *(199.64)*	23202 *(103.21)*	4.33 *(6.96)*	2004	5.3	0.400 *(0.243)*	17.50 *(3.45)*	0.020 *(0.012)*	210 *(99)*	47 *(8)*	28.38 *(96.11)*
					10th Gear					
276.48 *(206.17)*	21568 *(95.94)*	4.81 *(7.74)*	1911	4.8	0.395 *(0.240)*	17.72 *(3.49)*	0.017 *(0.010)*	209 *(98)*	48 *(9)*	28.39 *(96.12)*
					11th Gear					
281.12 *(209.63)*	20602 *(91.64)*	5.12 *(8.24)*	1745	4.6	0.386 *(0.235)*	18.11 *(3.57)*	0.017 *(0.011)*	209 *(98)*	48 *(9)*	28.38 *(96.11)*
					12th Gear					
283.39 *(211.32)*	18324 *(81.51)*	5.80 *(9.33)*	1700	4.0	0.382 *(0.233)*	18.30 *(3.61)*	0.017 *(0.010)*	209 *(98)*	48 *(9)*	28.40 *(96.17)*
					13th Gear					
283.33 *(211.28)*	15699 *(69.83)*	6.77 *(10.90)*	1700	3.4	0.381 *(0.232)*	18.35 *(3.62)*	0.017 *(0.010)*	209 *(98)*	48 *(9)*	28.41 *(96.19)*
					14th Gear					
280.60 *(209.24)*	13476 *(59.94)*	7.81 *(12.57)*	1700	3.0	0.384 *(0.234)*	18.22 *(3.59)*	0.017 *(0.010)*	209 *(98)*	47 *(8)*	28.41 *(96.21)*
					15th Gear					
279.73 *(208.59)*	11526 *(51.27)*	9.10 *(14.65)*	1700	2.5	0.387 *(0.235)*	18.10 *(3.57)*	0.017 *(0.010)*	209 *(98)*	47 *(8)*	28.41 *(96.21)*

HYDRAULIC PERFORMANCE

CATEGORY: IVN
Quick Attach: Yes
OECD Static test

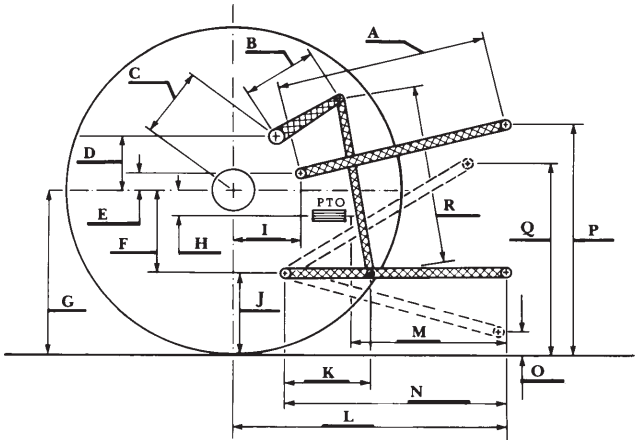
	Lift cylinders
Maxmum force exerted through whole range:	20254 lbs *(90.1 kN)* 2x115 mm
	15229 lbs *(67.7 kN)* 2x100 mm

	85 cc pump	85 cc and 35cc pumps combined
i) Sustained pressure at compensator cutoff:	2882 psi *(199 bar)*	2915 psi *(201 bar)*
three outlet sets combined		
ii) Pump delivery rate at minimum pressure and rated engine speed:	61.2 GPM *(231.5 l/min)*	86.0 GPM *(325.4 l/min)*
iii) Pump delivery rate at maximum hydraulic power:	60.7 GPM *(229.6 l/min)*	80.5 GPM *(304.8 l/min)*
Delivery pressure:	2472 psi *(170 bar)*	2239 psi *(154 bar)*
Power:	87.5 HP *(65.2 kW)*	105.2 HP *(78.5 kW)*
single outlet set		
ii) Pump delivery rate at minimum pressure and rated engine speed:	1/2" couplers 36.5 GPM *(138.1 l/min)*	3/4" couplers 43.2 GPM *(163.3 l/min)*
iii) Pump delivery rate at maximum hydraulic power:	33.6 GPM *(127.2 l/min)*	41.9 GPM *(158.5 l/min)*
Delivery pressure:	2352 psi *(162 bar)*	2309 psi *(159 bar)*
Power:	46.1 HP *(34.4 kW)*	56.4 HP *(42.1 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 2233 for John Deere 8R 310 e23 Diesel. Lincoln, NE:Nebraska Tractor Test Laboratory. Retrieved from http://tractortestlab.unl.edu

JOHN DEERE 8R 310 DIESEL

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